# Gray's Manual of Botany

REVISED EDITION

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# BOTANY

OF

# THE NORTHERN UNITED STATES.

# MANUAL

OF

# THE BOTANY

OF THE

# NORTHERN UNITED STATES,

INCLUDING THE DISTRICT EAST OF THE MISSISSIPPI AND
NORTH OF NORTH CAROLINA AND TENNESSEE.

By ASA GRAY,
LATE FISHER PROFESSOR OF NATURAL HISTORY IN HARVARD UNIVERSITY.

Sixth Edition.

REVISED AND EXTENDED WESTWARD TO THE 100th MERIDIAN,
BY
SERENO WATSON,
CURATOR OF THE GRAY HERBARIUM, HARVARD UNIVERSITY,
AND
JOHN M. COULTER,
PROFESSOR OF BOTANY IN WABASH COLLEGE,
*ASSISTED BY SPECIALISTS IN CERTAIN GROUPS.*

**WITH TWENTY-FIVE PLATES,**
ILLUSTRATING THE SEDGES, GRASSES, FERNS, ETC.

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# NOTE.

In this second issue of the Manual are given all such needed emendations of every kind as have come to our notice. Wherever it could be conveniently done, these alterations have been made in the plates. The remainder will be found in supplementary "Additions and Corrections" near the end of the volume.

# PREFACE.

The first edition of Gray's Manual was published in 1848. It was to a great extent rewritten and its range extended in 1856, and it was again largely rewritten in 1867. The great advances that have since been made in systematic botany and in the knowledge of our flora have for several years past made another revision desirable, which Dr. Gray before his death was purposing to undertake.

The present editors, acting to the best of their ability in his stead, have endeavored throughout to follow his methods and views. The original plan, so long retained by Dr. Gray and so generally approved, has been closely adhered to, the characters and descriptions of the last edition have been left essentially unchanged so far as possible, and in the numerous alterations and additions that have been considered necessary or advisable, his conclusions and principles have governed in every matter of importance, so far as they could be known. The effort especially has been to maintain that high standard of excellence which has always made the Manual an authority among botanists.

In the treatment of the genera and species, Gray's Synoptical Flora has been made the basis in the revision of the Gamopetalous Orders, and his manuscript in continuation of that work, so far as prepared, for the Polypetalous Orders which precede *Leguminosæ* (excepting *Nuphar*, the *Cruciferæ*, *Caryophyllaceæ*, *Vitis*, and the small Orders numbered 18, 22, 23, 25–27, and 29). The genus *Salix* has been rewritten for this edition by M. S. Bebb, Esq., the genus *Carex* by Prof. L. H. Bailey, and the Ferns and allied orders by Prof. D. C. Eaton. For the rest, all known available sources of information have been made use of, and much willing help has been received from botanists in all parts of our territory.

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The increasing interest that is taken in the study of the Cellular Cryptogams, and the desire to encourage it, have led to the inclusion again of the Hepaticæ, which were omitted in the last edition. These have been prepared through the kindness of Prof. L. M. Underwood, though the limits of the volume have necessitated somewhat briefer descriptions than he considered desirable. The three fine plates illustrating the genera of these Orders, which were used in the early editions, are also added, with a supplementary one, as well as an additional one in illustration of the Grasses, thus increasing the number of plates to twenty-five. A Glossary of botanical terms is appended, to meet an expressed need of those who use the Manual alone, and a Synopsis of the Orders in their sequence is given, to contrast more clearly their characters, and to show the general principles which have determined their present arrangement. This should be a useful adjunct to the more artificially arranged Analytical Key.

Geographical Limits, and Distribution.—The southern limit of the territory covered by the present work is the same as in the later previous editions, viz. the southern boundary of Virginia and Kentucky. This coincides better than any other geographical line with the natural division between the cooler-temperate and the warm-temperate vegetation of the Atlantic States. The rapid increase of population west of the Mississippi River, and the growing need of a Manual covering the flora of that section, have seemed a sufficient reason for the extension of the limits of the work westward to the 100th meridian, thus connecting with the *Manual of the Flora of the Rocky Mountain Region* by Prof. Coulter. These limits, as well as that upon the north, have been in general strictly observed, very few species being admitted that are not known with some degree of certainty to occur within them. The extreme western flora is no doubt imperfectly represented.

The distribution of the individual species is indicated somewhat more definitely than heretofore in many cases, so far as it could be satisfactorily ascertained. The extralimital range is also sometimes given, but the terms "northward," "southward," and "westward" are more frequently employed, signifying an indefinite range in those directions beyond the limits of the Manual. Where no definite habitat is specified, the species may be understood as found more or less generally throughout the whole area, or at least to near the western limits.

NOMENCLATURE, ACCENTUATION OF NAMES, etc. — In case of question respecting the proper name to be adopted for any species, Dr. Gray's known and expressed views have been followed, it is believed, throughout the work. While reasonable regard has been paid to the claims of priority, the purpose has been to avoid unnecessary changes, in the belief that such changes are in most cases an unmitigated evil. Synonyms are rarely given except where changes have been made. As a guide to correct pronunciation, the long sound of the accented vowel (modified often in personal names) is indicated, as heretofore, by the grave accent (\`), and the short sound by the acute (′). In regard to the derivations of generic names, many valuable suggestions have been due to W. R. Gerard, Esq., of New York.

PROMINENT CHARACTERS are indicated by the use of *Italic type* for the leading distinctions of the Orders, and generally in the specific descriptions for those points by which two or more nearly allied species may be most readily distinguished. The ready discrimination of the genera is provided for by a Synopsis of their leading characters under each order. Whenever a genus comprises several species, pains have been taken to render important differences conspicuous by proper grouping, and when needed by a series of subordinate divisions and subdivisions. The headings of these various groups are to be considered as belonging to and forming a part of the specific characters of the several species under them, — a fact which the student should always bear in mind.

ARRANGEMENT OF THE ORDERS. — The Natural Orders are disposed in very close accordance with the method followed by Bentham and Hooker in the *Genera Plantarum*, the principles of which are concisely shown in the Synopsis of Orders which precedes the Analytical Key. The *Gymnospermæ* are retained as a Subclass following the Angiospermous Dicotyledons, with which they have an obvious relationship, in preference to placing them, as some authorities would do, next before the Pteridophytes, to which their affinity, if no less certain, is nevertheless obscure. A more natural arrangement than either would be the withdrawal of the Endogens, placing them at the beginning, in perhaps an inverse order.

Analytical Key to the Orders.—As stated in Dr. Gray's Preface to the last edition, this is designed to enable the student to refer readily to its proper Order any of our plants, upon taking the pains to ascertain the structure of its flowers, and sometimes of the fruit, and by following out a series of easy steps in the analysis. It is founded upon the most obvious distinctions which will answer the purpose, and is so contrived as to provide for all or nearly all exceptional instances and variant cases. Referring to the Order which the Key leads him to, the student will find its most distinctive points brought together and printed in Italics in the first sentence of the ordinal description, and thus can verify his results. The Synopsis which follows will then lead him to the genus, to be verified in turn by the full generic description in its place; and the progress thence to the species is facilitated, when there are several to choose from, by the arrangement under divisions and subdivisions, as already explained.

It will be seen that the Key directs the inquirer to ascertain, first, the Class of the plant under consideration,—which, even without the seeds, is revealed at once by the plan of the stem, as seen in a cross-section, and usually by the veining of the leaves, and is commonly confirmed by the numerical plan of the flower;—then, if of the first Class, the Subclass is at once determined by the pistil, whether of the ordinary kind, or an open scale bearing naked ovules. If the former, then the choice between the three Divisions is determined by the presence or absence of the petals, and whether separate or united. Each Division is subdivided by equally obvious characters, and, finally, a series of successively subordinated propositions,—each set more indented upon the page than the preceding,—leads to the name of the Order sought for, followed by the number of the page upon which it is described in the body of the work.

The book is now submitted to those for whose benefit it has been prepared, in the trust that its shortcomings will meet with friendly indulgence, and with the earnest request that information be kindly given of any corrections or additions that may appear to be necessary.

SERENO WATSON.

Cambridge, Mass., Dec. 26, 1889.

# SYNOPSIS OF THE ORDERS OF PLANTS

## DESCRIBED IN THIS WORK.

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SERIES I. PHÆNOGAMOUS OR FLOWERING PLANTS: those producing real flowers and seeds.

CLASS I. DICOTYLEDONOUS OR EXOGENOUS PLANTS.

Stems formed of bark, wood, and pith; the wood forming a zone between the other two, and increasing, when the stem continues from year to year, by the annual addition of a new layer to the outside, next the bark. Leaves netted-veined. Embryo with a pair of opposite cotyledons, or in Subclass II. often three or more in a whorl. Parts of the flower mostly in fours or fives.

SUBCLASS I. ANGIOSPERMÆ. Pistil consisting of a closed ovary which contains the ovules and becomes the fruit. Cotyledons only two.

DIVISION I. POLYPETALOUS: the calyx and corolla both present; the latter of *separate* petals. (Apetalous flowers occur in various Orders, as noted under the subdivisions.)

**A.** THALAMIFLORÆ. Stamens and petals hypogynous (free both from the calyx and from the superior ovary), upon a usually narrow receptacle (not glandular nor discoid, except in Reseda, sometimes stipe-like). (Stamens and petals upon the partly inferior ovary in some Nymphæaceæ.) Apetalous flowers occur in the Ranunculaceæ and Caryophyllaceæ.

* 1. Carpels solitary or distinct (or coherent in Magnoliaceæ); sepals and petals deciduous (except in Nymphæaceæ); leaves alternate or radical, without stipules (sometimes opposite or whorled and rarely stipular in Ranunculaceæ); embryo (except in Nelumbo) small, in fleshy albumen.

1. **Ranunculaceæ** (p. 34). Sepals (3 or more), petals (as many, in regular flowers, or none), stamens (usually many), and carpels (1 – many) all distinct. Fruit achenes, follicles, or berries. Mostly herbs.
2. **Magnoliaceæ** (p. 49). Sepals and petals colored alike, in three or more rows of three, imbricate. Fruit cone-like, formed of the numerous cohering pistils. Trees.
3. **Anonaceæ** (p. 50). Sepals (3) and petals (6, in two rows) valvate. Fruit pulpy. Shrubs or small trees.
4. **Menispermaceæ** (p. 51). Sepals and petals in twos or threes, imbricate. Pistils becoming 1-seeded drupes. Diœcious woody climbers, with palmate or peltate leaves.

5. **Berberidaceæ** (p. 52). Sepals and petals imbricate, each in two rows of three (rarely in twos or fours). Stamens opposite the petals. Pistil solitary, becoming a berry or pod. Shrubs or low herbs.

6. **Nymphæaceæ**, in part (p. 54). Sepals and petals each 3, or many in several rows. Pistils becoming coriaceous and indehiscent. Aquatics; floating leaves peltate.

* 2. Carpels (2 or more) united into a compound ovary with parietal, often nerve-like placentæ (or the seeds covering the inner surface in Nymphæaceæ, and the placentæ axile in Sarraceniaceæ). Herbs (some Cistaceæ somewhat shrubby).

+ Fruit 5 – many-celled; calyx or whole perianth persistent; embryo small, at the base of fleshy albumen.

6. **Nymphæaceæ** proper (p. 54). Sepals 2 – 6. Petals and stamens numerous, on a thick hypogynous receptacle or inserted upon the ovary. Capsule 8 – 30-celled. Aquatics, with peltate or cordate leaves.

7. **Sarraceniaceæ** (p. 57). Sepals and petals 5. Capsule 5-celled. Marsh plants, with pitcher-shaped leaves.

+ + Fruit 1-celled, or spuriously 2 – more-celled by partitions connecting the placentæ.

++ Embryo minute at the base of fleshy albumen; perianth deciduous; sepals 2.

8. **Papaveraceæ** (p. 57.) Flowers regular. Sepals fugacious. Petals 4 – 12. Stamens and seeds numerous. Capsule 2 – several-valved. Juice milky or colored.

9. **Fumariaceæ** (p. 59.) Flowers irregular. Petals 4, in dissimilar pairs. Stamens 6, diadelphous. Fruit 2-valved (indehiscent and 1-seeded in Fumaria). Juice watery; leaves dissected.

++ ++ Albumen none; embryo curved or folded; perianth deciduous (sepals persistent in Resedaceæ).

10. **Cruciferæ** (p. 61). Sepals and petals 4. Stamens mostly 6, tetradynamous (two inserted lower and shorter). Pod 2-celled by a transverse partition, 2-valved, or sometimes indehiscent or transversely jointed. Bracts and stipules none.

11. **Capparidaceæ** (p. 74). Sepals and petals 4. Stamens 6 or more, nearly equal. Pod 1-celled, 2-valved. Embryo coiled. Leaves often palmately divided; bracts and stipules often present.

12. **Resedaceæ** (p. 75). Sepals and petals 4 – 7, irregular. Stamens indefinite on an hypogynous disk, not covered in the bud. Pod 1-celled, 3 – 6-lobed, opening at the top.

++ ++ ++ Embryo rather large in fleshy albumen; placentæ on the middle of the valves; calyx persistent.

13. **Cistaceæ** (p. 76). Flowers regular; sepals and petals 5, the two outer sepals minute. Stamens indefinite. Pod 1-celled, 3 – 5-valved. Ovules orthotropous. Embryo curved. Leaves entire, the lower often opposite.

14. **Violaceæ** (p. 78). Flowers irregular; sepals and petals 5. Stamens 5, with connivent introrse anthers. Style clavate. Pod 1-celled, 3-valved. Ovules anatropous. Embryo straight. Stipules present.

* 3. Ovary compound, 1-celled, with central placentæ; embryo curved around mealy albumen (except in Dianthus); leaves entire; stipules mostly none.

15. **Caryophyllaceæ** (p. 82). Sepals (5, rarely 4) distinct or united, persistent. Petals as many, rarely none. Stamens as many or twice as many, rarely fewer. Styles 2 – 5. Leaves opposite.

16. **Portulacaceæ** (p. 90). Sepals 2. Petals 5. Stamens 5 – 20. Capsule 3-valved or circumscissile. Fleshy herbs; leaves mostly alternate.

* 4. Calyx imbricate; stamens as many or twice as many as the petals or often indefinite; ovary compound, 1-celled with parietal placentæ or several-celled with the placentæ united in the axis; embryo straight or slightly curved; albumen none or scanty.

17. **Elatinaceæ** (p. 91). Small marsh annuals, with opposite leaves, membranous stipules, minute axillary flowers, few stamens, and pod 2 – 5-celled.

18. **Hypericaceæ** (p. 92). Herbs or shrubs, with opposite entire dotted leaves and no stipules. Flowers cymose or panicled. Stamens few or many, usually in 3 or more clusters. Pod 1-celled or 3 – 5-celled.

19. **Ternstrœmiaceæ** (p. 95). Trees or shrubs, with alternate leaves and no stipules. Flowers large, axillary, solitary. Stamens numerous, more or less united together and with the base of the petals. Pod 3 – 5-celled.

* 5. Calyx valvate; stamens numerous, usually more or less united together and with the base of the petals; ovary 3 – many-celled with the placentæ united in the axis (becoming 1-celled and 1-seeded in Tilia).

20. **Malvaceæ** (p. 96). Stamens monadelphous; anthers 1-celled. Calyx persistent. Seeds kidney-shaped, with curved embryo and little albumen. Herbs or shrubs, with alternate palmately veined stipular leaves.

21. **Tiliaceæ** (p. 101). Stamens polyadelphous or nearly distinct; anthers 2-celled. Calyx deciduous. Embryo nearly straight. Trees, with alternate leaves and deciduous stipules.

**B.** DISCIFLORÆ. Stamens as many as the petals or twice as many or fewer, inserted upon or at the outer or inner base of a more or less tumid hypogynous or perigynous disk, which is cushion-like or annular or divided into glands, sometimes obscure or minute (or none in Linum, Ilex, some Geraniaceæ and Polygala); ovary superior (or half-inferior in some Rhamnaceæ); sepals more usually distinct. Petals wanting in some Rutaceæ, Rhamnaceæ, and Sapindaceæ.

* 1. Ovules (mostly 1 or 2 in each cell) pendulous, with the rhaphe toward the axis of the ovary; disk often reduced to glands alternate with the petals or none; ovary often lobed or the carpels nearly distinct.

22. **Linaceæ** (p. 101). Flowers regular, usually 5-merous. Capsule not lobed, mostly 5-valved, spuriously 10-celled, 10-seeded. Stamens united at base. Disk none or 5 minute glands. Herbs, with entire alternate or opposite leaves; stipules gland-like or none.

23. **Geraniaceæ** (p. 102). Flowers regular or irregular, 5-merous or 3-merous as to the stamens and pistils. Ovary 3 – 5-lobed, the cells 1 – few-ovuled, and axis persistent. Disk of 5 glands or none. Herbs, with often lobed or divided mostly alternate leaves, with or without stipules.

24. **Rutaceæ** (p. 106). Flowers mostly regular, 3–5-merous, diœcious or polygamous in our genera. Ovary 2–5-lobed or the carpels nearly distinct, upon a glandular disk; cells 2-ovuled. Mostly shrubs or trees, with glandular-punctate compound leaves, without stipules.

∗ 2. Ovules (1 or 2) pendulous, the rhaphe away from the axis; disk none and ovary not lobed.

25. **Ilicineæ** (p. 107). Flowers small, diœciously polygamous, axillary, 4–8-merous. Fruit a 4–8-seeded berry-like drupe. Shrubs or trees, with simple alternate leaves and no stipules.

∗ 3. Ovules (1 or 2 in each cell) erect, the rhaphe toward the axis; disk fleshy, covering the base of the calyx; stamens as many as the petals, at the margin of the disk; flowers perfect or polygamo-diœcious; albumen fleshy; shrubs or trees, with simple leaves (compound in some Vitaceæ).

26. **Celastraceæ** (p. 109). Sepals and petals imbricated, the stamens alternate with the petals. Fruit 2–5-celled; seeds arilled.

27. **Rhamnaceæ** (p. 111). Calyx valvate. Petals small or none. Stamens alternate with the sepals. Fruit 2–5-celled; seeds solitary, not arilled.

28. **Vitaceæ** (p. 112). Calyx minute. Stamens opposite the valvate caducous petals. Climbing by tendrils opposite the alternate leaves.

∗ 4. Ovules (1 or 2) ascending or horizontal, or pendulous from a basal funicle; fleshy disk entire or lobed; stamens 5–10; shrubs or trees, with compound leaves (simple in Acer) and mostly polygamo-diœcious and often irregular flowers; petals imbricate (sometimes none in Sapindaceæ).

29. **Sapindaceæ** (p. 115). Flowers mostly unsymmetrical or irregular. Ovary 2–3-celled and -lobed.

30. **Anacardiaceæ** (p. 118). Flowers regular, 5-androus. Ovary 1-celled, becoming a small dry drupe. Leaves alternate; juice milky or resinous.

∗ 5. Ovules solitary, pendulous from the summit of the 2-celled ovary; disk none; flowers irregular (subpapilionaceous), hypogynous; stamens monadelphous or diadelphous; anthers 1-celled, opening by an apical pore.

31. **Polygalaceæ** (p. 120). Herbs, with perfect flowers and alternate or opposite or whorled entire leaves. Stamens 6–8. Seed carunculate.

**C.** CALYCIFLORÆ. Sepals rarely distinct; disk adnate to the base of the calyx, rarely tumid or conspicuous; petals and stamens on the calyx, perigynous or epigynous, the ovary being often inferior (hypogynous in Drosera and Parnassia, nearly so in some Leguminosæ and Crassulaceæ). Apetalous flowers in Orders 33, 35, 36, 38, 39, 41, 42, 47, and 50.

∗ 1. Ovary usually superior, the pistils solitary, or several and distinct (sometimes more or less united but at least the styles distinct except in some Saxifragaceæ).

32. **Leguminosæ** (p. 122). Flowers papilionaceous or regular. Stamens usually 10, and mostly monadelphous or diadelphous. Pistil one, free, becoming a legume; style terminal. Albumen none. Leaves mostly compound, alternate, stipular.

33. **Rosaceæ** (p. 150). Flowers regular, with usually numerous distinct stamens, and 1–many pistils, distinct or (in Pomeæ) united and combined

with the calyx-tube; style often lateral or basal. Calyx-lobes and petals mostly 5. Ovules mostly 1 or 2. Albumen mostly none. Trees, shrubs, or herbs; leaves usually alternate and stipulate, simple or compound.

34. **Calycanthaceæ** (p. 167). Calyx-lobes, petals, and stamens indefinite. Pistils numerous, becoming achenes in a hollow receptacle. Albumen none. Aromatic shrubs, with opposite entire leaves and no stipules.
35. **Saxifragaceæ** (p. 168). Flowers regular, with 5 – 10 stamens (numerous in Philadelphus), few (mostly 2) more or less united, free or partially adnate carpels, and few – many ovules on axile or sometimes parietal placentæ. Seeds albuminous. Herbs or shrubs, with opposite or alternate leaves, with or without stipules.
36. **Crassulaceæ** (p. 170). Mostly fleshy herbs, with symmetrical flowers, the usually distinct many-seeded carpels as many as the sepals. Seeds albuminous. Leaves alternate or opposite or whorled; stipules none.
37. **Droseraceæ** (p. 178). Glandular-haired scapose marsh herbs, with regular 5-merous hypogynous flowers. Capsule 1-celled, with 3 – 5 many-seeded parietal placentæ. Anthers extrorse. Leaves circinate in vernation.
38. **Hamamelideæ** (p. 179). Shrubs or trees; flowers often polygamo-monœcious, in clusters, heads, or spikes; petals often none. Seeds 2 or more, bony, in a 2-beaked woody pod opening above, the base adnate to the calyx-tube. Stamens few or many. Leaves alternate, simple.
39. **Halorageæ** (p. 180). Aquatic or marsh herbs; flowers perfect or polygamo-diœcious, small, axillary or spicate; petals often none. Stamens 1 – 8. Ovary inferior, the calyx-limb obsolete or very short. Fruit small, indehiscent, 1 – 4-celled, 1 – 4-seeded. Leaves alternate or opposite, the submersed often dissected.

* 2. Ovary inferior (except in Lythraceæ), 1 – several-celled; style entire; flowers perfect, regular or nearly so, mostly 4-merous; herbs, with simple and mostly entire leaves without stipules.

40. **Melastomaceæ** (p. 183). Calyx open. Stamens definite; anthers opening by an apical pore. Leaves opposite, 3 – 7-nerved; flowers cymose.
41. **Lythraceæ** (p. 184). Calyx-lobes valvate. Pod free, but enclosed in the calyx, membranous, 1 – 4-celled, many-seeded with axile placentæ. Leaves mostly opposite; flowers axillary or whorled; petals crumpled, or none.
42. **Onagraceæ** (p. 186). Calyx-lobes valvate. Ovary 1 – 4-celled, the cells 1 – many-ovuled. Stamens 2, 4, or 8. Petals 2 or 4, convolute, or none. Leaves opposite or alternate.

* 3. Ovary inferior (except in Passifloraceæ and Ficoideæ), 1-celled with parietal placentæ or several-celled by the intrusion of the placentæ; flowers regular, perfect or unisexual; styles free or united; herbs.

+ Embryo straight; cotyledons foliaceous; leaves alternate, often lobed.

43. **Loasaceæ** (p. 193). Flowers perfect. Stamens indefinite. Style entire or 2 – 3-cleft. Capsule 1-celled, with 2 or 3 many-seeded placentæ. Pubescence of hooked hairs.
44. **Passifloraceæ** (p. 194). Climbing by tendrils. Flowers perfect. Stamens 5, monadelphous. Ovary stalked, superior, becoming a 1-celled many-seeded berry with 3 or 4 placentæ. Styles 3, clavate.

45. **Cucurbitaceæ** (p. 194). Tendril-bearing vines, with diœcious or monœcious flowers. Corolla 5-lobed, often confluent with the calyx. Stamens 3 or 5, usually more or less united and the anthers often tortuous. Fruit fleshy or membranous, 1 – 5-celled, the placentæ often produced to the axis and revolute. Seeds exalbuminous.

+– +– Embryo curved or coiled about central albumen; leaves entire.

46. **Cactaceæ** (p. 196). Fleshy and mostly leafless prickly plants, with solitary sessile perfect flowers. Calyx-lobes and petals indefinite, imbricated, the numerous stamens on the tube. Fruit a 1-celled many-seeded berry.

47. **Ficoideæ** (p. 198). Calyx-lobes or sepals 5 and petals none in our genera. Capsule 3 – 5-celled with axile placentæ, loculicidal or circumscissile, many-seeded. Often fleshy; leaves mostly opposite or verticillate.

* 4. Flowers small, regular, perfect or polygamous; calyx-limb minute or obsolete; ovary inferior, 2 – several-celled, with solitary pendulous ovules; petals and stamens mostly 4 or 5, on the margin of an epigynous disk surrounding the styles; albumen copious.

48. **Umbelliferæ** (p. 198). Flowers in umbels or heads. Petals (inflexed) and stamens 5. Styles 2. Fruit of 2 dry seed-like carpels, the pericarp usually with oil-tubes. Herbs, with alternate mostly compound leaves.

49. **Araliaceæ** (p. 212). Flowers mostly in umbels and nearly as in Umbelliferæ; petals not inflexed and styles 2 or more. Fruit a 2 – several-celled drupe. Herbs or shrubs, with alternate mostly compound leaves.

50. **Cornaceæ** (p. 213). Flowers not in umbels; petals (valvate, or none) and stamens 4 or 5. Style 1. Fruit a 1 – 2-seeded drupe. Trees, shrubs, or rarely herbs, with opposite or alternate simple and mostly entire leaves.

DIVISION II. GAMOPETALOUS: calyx and corolla both present, the latter of united petals (excepting some Ericaceæ, Styracaceæ, and Oleaceæ, Galax, Statice, and Lysimachia). Apetalous flowers occur in Glaux and some Oleaceæ. Stipules present only in Rubiaceæ and Loganiaceæ, or rarely in Caprifoliaceæ.

* 1. Ovary inferior; stamens borne upon the corolla, alternate with its lobes.

+– Stamens distinct; leaves opposite or whorled; seed albuminous except in Valerianaceæ.

51. **Caprifoliaceæ** (p. 216). Corolla mostly 5-lobed, regular or irregular, the stamens as many (one fewer in Linnæa, doubled in Adoxa). Ovary 1 – several-celled; fruit a berry, drupe, or pod, 1 – several-seeded. Shrubs or herbs; leaves opposite, rarely stipular, not turning black in drying.

52. **Rubiaceæ** (p. 222). Flowers regular, 4 – 5-merous, the corolla mostly valvate. Ovary 2 – 4-celled. Herbs or shrubs; leaves simple, entire, opposite with stipules, or verticillate, usually turning black in drying.

53. **Valerianaceæ** (p. 228). Stamens (1 – 4) fewer than the lobes of the somewhat irregular corolla. Ovary with two abortive or empty cells and one containing a suspended ovule. Fruit dry and indehiscent. Herbs.

54. **Dipsaceæ** (p. 229). Flowers mostly 4-merous and with 4 (rarely 2) stamens, involucellate in involucrate heads; corolla-lobes imbricate. Ovary simple, 1-celled, with a suspended ovule. Herbs.

+- +- Anthers connate into a tube.

55. **Compositæ** (p. 230). Stamens as many as the valvate corolla-lobes. Ovary with a solitary erect ovule, becoming an achene. Albumen none. Calyx-limb reduced to a pappus or none. Flowers in involucrate heads.

* 2. Ovary inferior (or superior in most Ericaceæ and in Diapensiaceæ); stamens free from the corolla or nearly so (adnate in some Diapensiaceæ), as many as the lobes and alternate with them, or twice as many; leaves alternate (opposite in some Ericaceæ); style 1.

+- Juice milky; capsule 2–5-celled, many-seeded; herbs.

56. **Lobeliaceæ** (p. 305). Corolla irregular, 5-lobed. Stamens united, at least by the anthers. Capsule 2-celled or with two placentæ.

57. **Campanulaceæ** (p. 307). Corolla regular, 5-lobed, valvate. Stamens usually distinct. Capsule 2–several-celled.

+- +- Juice not milky nor acrid; capsule 3–10-celled.

58. **Ericaceæ** (p. 309). Flowers mostly regular, 4–5-merous. Stamens distinct, more usually twice as many as the corolla-lobes or petals. Ovary inferior or superior. Herbs or shrubs.

59. **Diapensiaceæ** (p. 326). Flowers regular. Stamens 5, on the corolla, or monadelphous with 5 petaloid staminodia. Ovary superior, 3-celled.

* 3. Ovary superior; stamens as many as the corolla-lobes and opposite them.

60. **Plumbaginaceæ** (p. 327). Stamens 5, on the base of the petals. Styles 5. Fruit an achene or 1-seeded utricle. Herbs; leaves radical.

61. **Primulaceæ** (p. 328). Stamens 4–8, perigynous. Style 1. Fruit a capsule with several seeds on a central placenta. Herbs; leaves radical or opposite or alternate.

62. **Sapotaceæ** (p. 332). Flowers small, 4–5-merous. Style 1. Ovary few–several-celled; fruit fleshy, bearing a single bony-coated seed. Shrubs or trees, with milky juice and alternate entire leaves.

* 4. Ovary superior or more or less adnate to the calyx, few–several-celled, the cells 1-ovuled; stamens twice as many as the corolla-lobes or more; trees or shrubs, with alternate leaves.

63. **Ebenaceæ** (p. 333). Flowers diœcious or polygamous Stamens on the corolla. Ovary superior. Styles distinct. Fruit fleshy, few-seeded.

64. **Styracaceæ** (p. 333). Flowers perfect. Stamens subhypogynous. Ovary more or less inferior. Style 1. Fruit dry or nearly so, 1–4-seeded.

* 5. Ovary superior, of two carpels (sometimes by division apparently 4-carpellary, sometimes of 3–5 in Polemoniaceæ, Convolvulaceæ, and Solanaceæ); stamens on the corolla (except in apetalous Oleaceæ), alternate with its lobes, as many or fewer.

+- Corolla not scarious and nerveless.

++ Corolla none, or regular and 4-cleft or -parted, the stamens fewer than its lobes; style 1; seeds 1–3.

65. **Oleaceæ** (p. 335). Trees or shrubs, with opposite and pinnate or simple leaves. Flowers perfect or polygamo-diœcious. Stamens mostly 2, alternate with the usually 2-ovuled carpels.

++ ++ Corolla regular, its lobes 4–5 or rarely more; stamens as many.

= Ovaries 2, becoming follicles; stigmas and sometimes the styles united; herbs with milky juice, perfect 5-merous flowers, and simple entire leaves.

66. **Apocynaceæ** (p. 337). Stamens distinct or the anthers merely connivent, with ordinary pollen. Style 1.

67. **Asclepiadaceæ** (p. 338). Stamens monadelphous, the anthers permanently attached to a large stigmatic body; pollen mostly in waxy masses. Styles distinct below the stigma.

= = Ovary compound (ovaries two in Dichondra), with 2 or 3 (rarely 4 or 5) cells or placentæ; stamens distinct; mostly herbs.

*a.* Leaves opposite; corolla-lobes 4 or 5 or more.

68. **Loganiaceæ** (p. 345). Leaves entire, with stipules or a stipular line joining their bases. Capsule 2-celled, few–many-seeded. Herbs or woody twiners (our species).

69. **Gentianaceæ** (p. 346). Glabrous herbs; leaves entire, sessile and simple (except in Menyanthes). Capsule 1-celled with 2 parietal placentæ or the whole inner surface ovuliferous, many-seeded.

*b.* Leaves alternate (sometimes opposite in Polemoniaceæ and Hydrophyllaceæ); corolla-lobes always 5 in our species.

70. **Polemoniaceæ** (p. 354). Capsule usually 3-celled, loculicidal; seeds 1–many in each cell on the stout placental axis. Style 3-cleft or -lobed. Leaves opposite or alternate, simple or compound.

71. **Hydrophyllaceæ** (p. 357). Leaves often lobed or divided, and the inflorescence frequently scorpioid. Style 2-parted or 2-lobed. Capsule 1-celled, 2-valved with two parietal or introflexed placentæ, or sometimes 2-celled. Seeds 2 or more on each placenta.

72. **Borraginaceæ** (p. 360). Leaves mostly entire and plants often rough-hispid; inflorescence commonly scorpioid. Style 1. Ovary 4-ovulate, usually 4-lobed and maturing as 4 separate or separable nutlets, or not lobed, 2–4-celled and separating when ripe into 2 or 4 nutlets.

73. **Convolvulaceæ** (p. 367). Usually twining or trailing; flowers on axillary peduncles or cymose-glomerate. Corolla 5-lobed or 5-plaited, twisted in the bud. Styles 1 or 2. Ovary 2- (sometimes 3- or spuriously 4-) celled, becoming a globular 4–6-seeded capsule (or ovaries two and distinct in Dichondra). Cotyledons broad-foliaceous.

74. **Solanaceæ** (p. 373). Style 1. Ovary 2-celled (rarely 3–5-celled), with numerous ovules on axillary placentæ, becoming a pod or berry. Cotyledons narrow.

++ ++ ++ Corolla more or less bilabiately irregular (sometimes nearly regular), 5-lobed. Fertile stamens 4 and didynamous, or 2. Style 1. Ovary always of two carpels.

*a.* Ovules several or many.

75. **Scrophulariaceæ** (p. 377). Capsule 2-celled, with central placentæ. Seeds small, usually numerous. Herbs; leaves alternate or opposite.

76. **Orobanchaceæ** (p. 393). Root-parasites with no green foliage. Capsule 1-celled, with 2 simple or double parietal placentæ. Seeds many.

77. **Lentibulariaceæ** (p. 395). Aquatic or marsh herbs, with scapes or scape-like peduncles, sometimes nearly leafless. Corolla personate and spurred. Capsule globular, 1-celled; placentæ central, free, many-seeded.

78. **Bignoniaceæ** (p. 398). Large-flowered trees or often climbing shrubs, with usually opposite simple or compound leaves. Capsule 2-celled by a partition between the 2 parietal placentæ. Seeds numerous, large, mostly winged.

79. **Pedaliaceæ** (p. 399). Herbs, with opposite simple leaves. Ovary 1-celled with two bilamellar parietal placentæ, or 2–4-celled by their union, becoming drupaceous or capsular. Seeds few or many, wingless.

80. **Acanthaceæ** (p. 399). Herbs, with opposite simple leaves. Capsule 2-celled, loculicidal, with each axile placenta bearing 2–10 flattish seeds.

*b.* Cells of the ovary 1–2-ovuled; herbs or low shrubs, with opposite leaves.

81. **Verbenaceæ** (p. 401). Ovary 2–4-celled, not lobed, the dry or drupaceous fruit separating into 2 or 4 1-seeded nutlets (fruit 1-celled and 1-seeded in Phryma). Style terminal.

82. **Labiatæ** (p. 403). Ovary deeply 4-lobed around the style, the lobes becoming dry seed-like nutlets. Stems square; aromatic.

+- +- Corolla scarious and nerveless; flowers regular, 4-merous; style 1.

83. **Plantaginaceæ** (p. 422). Scapose herbs, with perfect or polygamo-diœcious or monœcious flowers in 1–many-flowered spikes. Fruit a circumscissile 2-celled capsule, with one or more peltate seeds in each cell, or an achene.

## Division III. APETALOUS EXOGENS. The corolla wanting (except in some Euphorbiaceæ), and sometimes also the calyx.

* 1. Ovary superior (though sometimes enclosed within the calyx), 1-celled with a solitary basal ovule (several-celled in Phytolaccaceæ); embryo coiled or curved (nearly straight in Polygonaceæ) in or about mealy albumen (albumen none in some Chenopodiaceæ); herbs.

+- Fruit the hardened or membranous closed base of the corolla-like perianth enclosing a utricle.

84. **Nyctaginaceæ** (p. 425). Perianth tubular or funnelform. Stamens hypogynous. Fruit ribbed or winged. Leaves opposite; stipules none.

+- +- Fruit a utricle; perianth mostly persistent, small, 4–5-lobed or -parted, or none.

85. **Illecebraceæ** (p. 426). Perianth herbaceous. Stamens perigynous. Leaves opposite; stipules scarious (none in Scleranthus).

86. **Amarantaceæ** (p. 427). Flowers sessile, bracteate, the bracts (usually 3) more or less dry and scarious, as well as the 3–5 distinct sepals. Stamens 1–5, hypogynous. Utricle indehiscent or circumscissile. Embryo annular. Leaves mostly alternate, entire; stipules none.

87. **Chenopodiaceæ** (p. 430). Flowers sessile, not scarious-bracteate. Sepals greenish or succulent, 5 or fewer, or none. Stamens 5 or fewer, perigynous or hypogynous. Embryo annular or spiral or conduplicate. Leaves alternate; stipules none.

+ + + Ovary of several 1-ovuled carpels, in fruit a berry (in our genera).

88. **Phytolaccaceæ** (p. 435). Sepals 4–5, petaloid or herbaceous. Stamens 5–30, hypogynous. Carpels 5–12. Embryo annular. Leaves alternate, entire; stipules none.

+ + + + Fruit a triangular or lenticular achene.

89. **Polygonaceæ** (p. 436). Flowers on jointed pedicels. Calyx 3–6-lobed or -parted, more or less corolla-like. Stamens 4–12, on the calyx. Embryo nearly straight. Leaves alternate, with sheathing stipules or none.

* 2. Ovary compound, the cells many-ovuled (or 1-ovuled in Piperaceæ); embryo minute in copious albumen; flowers perfect.

90. **Podostemaceæ** (p. 444). Aquatic, with the aspect of sea-weeds or mosses, with minute naked flowers from a spathe-like involucre. Ovary superior; pod 2–3-celled.

91. **Aristolochiaceæ** (p. 444). Terrestrial herbs or climbing shrubs. Calyx valvate, adnate at least at base to the 6-celled many-seeded ovary. Stamens 6–12, more or less united with the style. Leaves alternate, mostly cordate; stipules none.

92. **Piperaceæ** (§ Saurureæ), (p. 446). Marsh herb (our species). Perianth none. Carpels 3–4, distinct, with usually a single ascending seed. Leaves alternate, entire.

* 3. Ovary superior, simple, 1-celled, 1-ovuled, forming a berry or drupe; trees or shrubs, with mostly entire leaves and no stipules.

93. **Lauraceæ** (p. 446). Flowers perfect or diœcious. Sepals 4 or 6, in 2 rows. Stamens 9–12; anthers opening by 2 or 4 uplifted valves. Seed suspended; albumen none. Aromatic; leaves alternate.

94. **Thymelæaceæ** (p. 448). Flowers perfect. Calyx corolla-like, 4–5-cleft. Stamens twice as many. Seed suspended, with little or no albumen. Acrid shrubs with very tough bark; leaves alternate.

95. **Elæagnaceæ** (p. 448). Flowers mostly diœcious. Calyx-tube becoming berry-like and enclosing the achene. Seed erect, albuminous. Leaves silvery-scurfy, opposite.

* 4. Ovary inferior, 1-celled, 1–3-ovuled (but 1-seeded); albumen without testa, bearing the embryo in a cavity at the apex; calyx-lobes valvate.

96. **Loranthaceæ** (p. 449). Parasitic on trees, with jointed stems and opposite leaves. Flowers diœcious. Ovule solitary, erect. Fruit a berry.

97. **Santalaceæ** (p. 450). Flowers perfect. Ovules 2–4, suspended from the apex of a central placenta. Fruit dry, indehiscent. Leaves alternate.

* 5. Flowers all unisexual (polygamous in some Urticaceæ and Empetraceæ, apparently perfect in Euphorbia); cells 1–2-ovuled; embryo nearly as long as the albumen or filling the seed; calyx often wanting, corolla-like only in some Euphorbiaceæ and Empetraceæ; stipules often present.

+ 1. Ovary superior, 3-celled (1-celled in Crotonopsis) with 1 or 2 pendulous ovules in each cell; herbs.

98. **Euphorbiaceæ** (p. 451). Flowers monœcious or diœcious (involucrate and apparently perfect in Euphorbia). Mostly with milky juice, and usually alternate often stipulate leaves.

+– 2. Ovary 1-celled, 1-seeded; trees or shrubs (except some Urticaceæ).

++ Calyx regular, the stamens as many as the lobes and opposite them or fewer; ovary superior.

99. **Urticaceæ** (p. 461). Flowers monœcious, diœcious, or (in Ulmeæ) perfect. Seeds exalbuminous or nearly so. Inflorescence very various.

++ ++ Perianth mostly none; at least the staminate flowers in aments or spikes or dense heads; albumen none.

100. **Platanaceæ** (p. 466). Trees, with alternate palmately lobed leaves, sheathing stipules, and monœcious flowers in separate globose heads. Ovary superior; fruit a club-shaped nutlet.

101. **Juglandaceæ** (p. 467). Trees, with alternate pinnate leaves, no stipules, and monœcious flowers, the staminate in aments. Ovary inferior; fruit a nut.

102. **Myricaceæ** (p. 469). Shrubs, with resinous-dotted leaves, with or without stipules, and monœcious or diœcious flowers, both kinds in short scaly aments. Ovary superior, becoming a small drupe-like nut.

+– 3. Ovary 2–7-celled, with 1 or 2 suspended ovules in each cell, becoming 1-celled and 1-seeded; calyx mostly none or adherent to the ovary; trees or shrubs with simple leaves.

103. **Cupuliferæ** (p. 470). Flowers monœcious. Fruit a nut surrounded by an involucre, or (in Betuleæ) a small winged or angled naked nutlet in the axils of the scales of an ament.

+– 4. Ovary 1-celled, becoming a 2-valved pod with two parietal or basal placentæ bearing numerous small comose seeds; perianth none.

104. **Salicaceæ** (p. 480). Diœcious trees or shrubs, with both kinds of flowers in aments, and simple alternate stipulate leaves.

+– 5. Ovary several-celled, becoming a drupe containing 3–9 1-seeded nutlets; seed erect; low shrubby heath-like evergreens.

105. **Empetraceæ** (p. 487). Flowers polygamous or diœcious, scaly-bracted. Sepals somewhat petaloid or none. Embryo axile in copious albumen.

+– 6. Ovary 1-celled with a suspended ovule, becoming an achene; calyx none; aquatic herbs, with finely dissected whorled leaves.

106. **Ceratophyllaceæ** (p. 488). Flowers monœcious, minute, axillary and sessile. Albumen none; the seed filled with a highly developed embryo.

SUBCLASS II. GYMNOSPERMOUS EXOGENS. Ovules naked upon a scale, bract, or disk. Cotyledons two or more.

107. **Coniferæ** (p. 489). Resiniferous trees or shrubs, with mostly awl-shaped or needle-shaped and evergreen leaves, and monœcious or diœcious flowers.

## CLASS II. MONOCOTYLEDONOUS PLANTS.

Stems without central pith or annular layers, but having the woody fibres distributed irregularly through them (a transverse slice showing the fibres as dots scattered through the cellular tissue). Embryo with a single cotyledon and the early leaves always alternate. Parts of the flower usually in threes (never in fives), and the leaves mostly parallel-veined. Our species herbaceous, excepting Smilax.

* Ovary inferior (superior in Bromeliaceæ, nearly so in some Hemodoraceæ); at least the inner lobes of the perianth petal-like.

+- 1. Seeds without albumen, very numerous and minute.

108. **Hydrocharidaceæ** (p. 495). Aquatics, with diœcious or polygamous flowers from a spathe; outer perianth calyx-like, the inner sometimes wanting. Stamens 3 – 12. Ovary 1-celled with 3 parietal placentæ or 6 – 9-celled with axile placentæ.

109. **Burmanniaceæ** (p. 496). Terrestrial, with scale-like cauline leaves and regular perfect triandrous flowers. Perianth corolla-like.

110. **Orchidaceæ** (p. 497). Terrestrial, with very irregular perfect flowers. Stamens and style connate; anthers 1 or 2. Capsule 1-celled; placentæ 3, parietal. Perianth corolla-like.

+- 2. Seeds albuminous. (Ovary 3-celled and flowers regular in our genera.)

111. **Bromeliaceæ** (p. 511). Mostly epiphytes, with dry persistent scurfy leaves. Flowers 6-androus; outer perianth calyx-like.

112. **Hemodoraceæ** (p. 512). Fibrous-rooted, with equitant leaves and perfect 3- or 6-androus flowers. Perianth persistent, woolly or scurfy outside. (Ovary sometimes nearly free; leaves flat in Aletris.)

113. **Iridaceæ** (p. 513). Root not bulbous; leaves equitant in two ranks. Flowers from a spathe. Stamens 3, opposite the outer lobes of the corolla-like perianth; anthers extrorse.

114. **Amaryllidaceæ** (p. 515). Often bulbous-rooted and scapose. Perianth corolla-like. Stamens 6; anthers introrse.

115. **Dioscoreaceæ** (p. 517). Climbing, with net-veined leaves. Flowers diœcious, small, 6-androus; perianth calyx-like. Ovules 1 or 2 in each cell.

* * Ovary superior (very rarely partially adnate to the calyx in Liliaceæ).

+- 1. At least the inner perianth corolla-like; ovary compound; seeds with copious albumen.

116. **Liliaceæ** (p. 517). Flowers perfect, 6-androus, the regular perianth corolla-like (diœcious in Smilax, dimerous in Maianthemum, the outer divisions herbaceous in Trillium). Fruit a 3-celled capsule or berry.

117. **Pontederiaceæ** (p. 535). Aquatic, with more or less irregular perfect flowers from a spathe; perianth corolla-like. Stamens 3 or 6, mostly unequal or dissimilar. Capsule 1-celled or imperfectly 3-celled.

118. **Xyridaceæ** (p. 536). Rush-like, scapose. Flowers capitate, perfect, 3-androus, the calyx glumaceous. Capsule 1-celled.

119. **Mayaceæ** (p. 537). Moss-like aquatic. Flowers perfect, axillary, solitary, 3-androus; calyx herbaceous. Capsule 1-celled.

120. **Commelinaceæ** (p. 538). Flowers perfect, regular or somewhat irregular, with 3 more or less herbaceous persistent sepals and 3 fugacious petals. Stamens 6 or some sterile. Capsule 2 – 3-celled.

127. **Eriocauleæ** (p. 566). Scapose aquatic or marsh plants, with linear leaves and dense heads of monœcious (rarely diœcious) minute flowers. Corolla tubular or none. Capsule 2 – 3-celled, 2 – 3-seeded.

+- 2. Perianth small, of 6 equal persistent glumaceous segments; flowers perfect; ovary compound.

121. **Juncaceæ** (p. 539). Rush-like. Stamens 3 or 6. Capsule 1- or 3-celled, 3-valved.

+- 3. Flowers without chaffy glumes, the perianth none or reduced to bristles or sepal-like scales; flowers often monœcious or diœcious; carpels solitary or united.

++ Flowers capitate or upon a spike or spadix, with or without a spathe.

122. **Typhaceæ** (p. 547). Marsh or aquatic plants, with linear leaves, and monœcious flowers without proper perianth, in heads or a naked spike.
123. **Araceæ** (p. 548). Flowers perfect or monœcious upon the same spadix, rarely diœcious, with 4 or 6 scale-like sepals or none.

++ ++ Flowers very minute, one or few from the margin of a floating disk-like frond.

124. **Lemnaceæ** (p. 551). Plants very small, green, mostly lenticular or globose.

+- 4. Perianth of 4 or 6 segments, the inner often petaloid, or none; carpels solitary or distinct (coherent in Triglochin); seeds without albumen; aquatic or marsh plants, often monœcious or diœcious.

125. **Alismaceæ** (p. 553). Perianth of 6 segments, the inner petal-like.
126. **Naiadaceæ** (p. 557). Perianth-segments herbaceous or none.

+- 5. Flowers in the axils of chaffy scales or glumes arranged in spikes or spikelets, without evident perianth; stamens 1 – 3; ovary 1-celled, 1-seeded; seed albuminous.

128. **Cyperaceæ** (p. 567). Scales single. Perianth none or replaced by bristles. Anthers basifixed. Fruit a triangular or lenticular achene. Stem solid, often triangular, with closed sheaths.
129. **Gramineæ** (p. 623). Glumes in pairs. Perianth replaced by minute scales. Anthers versatile. Fruit a caryopsis. Culm usually hollow, terete; sheaths split to the base.

SERIES II. CRYPTOGAMOUS OR FLOWERLESS PLANTS; destitute of stamens and pistils, in fructification producing *spores* instead of seeds.

## CLASS III. ACROGENOUS PLANTS.

Cryptogamous plants with a distinct axis (stem and branches), growing from the apex only, and furnished for the most part with distinct leaves (sometimes taking the form of an expanded leaf-like usually prostrate *thallus*); reproduction by means of antheridia and archegonia, sometimes also by gemmation.

SUBCLASS I. VASCULAR ACROGENS, OR PTERIDOPHYTES. Stems (and foliage when present) containing both woody fibre and vessels; antheridia or archegonia, or both, borne on a minute prothallus, which is developed from the spore on germination.

* Spores of only one kind; prothallus bearing antheridia and archegonia.

130. **Equisetaceæ** (p. 675). Cylindric jointed hollow-stemmed plants, with toothed sheaths. Fructification in a terminal spike.

131. **Filices** (p. 678). Ferns, with fronds circinate in vernation, bearing the fructification on the under surface or beneath the margin.

132. **Ophioglossaceæ** (p. 693). Fronds often fern-like, erect in vernation. Sporangia globose, coriaceous, 2-valved, in special spikes or panicles.

133. **Lycopodiaceæ** (p. 695). Low moss-like plants with elongated stems and small persistent entire several-ranked leaves. Sporangia solitary, axillary, 1–3-celled, 2–3-valved.

* * Spores of two kinds, the *macrospore* producing a prothallus with archegonia, the *microspore* smaller and developing antheridia.

134. **Selaginellaceæ** (p. 697). Low leafy moss-like or marsh plants, with branching stems, and small 4–6-ranked leaves, or with a corm-like stem and basal linear-subulate leaves, the two kinds of spores in distinct solitary axillary 1-celled sporangia.

135. **Marsiliaceæ** (p. 700). The two kinds of spores in the same or different sporangia which are borne in a coriaceous peduncled sporocarp arising from a slender creeping rhizome. Fronds digitately 4-foliolate or filiform.

136. **Salviniaceæ** (p. 701). The two kinds of spores in separate thin-walled 1-celled sporocarps or conceptacles clustered beneath the small floating fronds; macrospores solitary.

SUBCLASS II. CELLULAR ACROGENS, OR BRYOPHYTES. Plants with cellular tissue only; both antheridia and archegonia borne upon the plant itself. — Including the MUSCI, or Mosses (which are not treated of here), never thallose, and bearing capsules which usually dehisce by a lid and contain spores only, and the HEPATICÆ, which bear capsules which dehisce by valves or irregularly and usually have elaters mingled with the spores. The latter division comprises the following Orders.

* Capsule 4-valved; plant a leafy axis or sometimes a branching thallus.

137. **Jungermanniaceæ** (p. 702). Leaves, when present, without a midrib, 2-ranked, with often a third row beneath; pedicels slender.

* * Capsule 2-valved, or dehiscing irregularly, or indehiscent; plant a thallus or thalloid stem.

138. **Anthocerotaceæ** (p. 726). Thallus without epidermis, irregularly branching; pedicels stout or none. Capsule with a columella. Elaters mostly without fibres.

139. **Marchantiaceæ** (p. 727). Thallus radiate or dichotomous, the epidermis usually porose. Capsules borne on the under side of a pedunculate receptacle, irregularly dehiscent. Elaters 2-spiral.

140. **Ricciaceæ** (p. 730). Thallus radiate or dichotomous, the epidermis eporose. Capsules immersed in the thallus or sessile upon it, indehiscent. Elaters none.

# ANALYTICAL KEY TO THE ORDERS.

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## Class I. DICOTYLEDONOUS PLANTS. (See p. 5.)

### Subclass I. ANGIOSPERMÆ. Pistil consisting of a closed ovary. Cotyledons only two.

### Division I. POLYPETALOUS: the calyx and corolla both present; the latter of *separate* petals.

**A.** *Stamens numerous, at least more than* 10, *and more than twice the sepals or lobes of the calyx.*

**1.** *Calyx entirely free and separate from the pistil or pistils.*

Pistils numerous but cohering over each other in a solid mass on an elongated receptacle. . . . . . Magnoliaceæ, 49 (Page)
Pistils numerous, separate, but concealed in a hollow receptacle.
Leaves opposite, entire; no stipules. . . . Calycanthaceæ, 167
Leaves alternate, with stipules. . . . . Rosa, in Rosaceæ, 162
Pistils several, immersed in hollows of the upper surface of a large top-shaped receptacle. . Nelumbo, in Nymphæaceæ, 55
Pistils more than one, separate, not enclosed in the receptacle.
Stamens inserted on the calyx, distinct. . . . . Rosaceæ, 150
Stamens united with the base of the petals, monadelphous. Malvaceæ, 96
Stamens inserted on the receptacle.
Filaments much shorter than the anther; trees. . . Anonaceæ, 50
Filaments longer than the anther.
Flowers diœcious; twiners with alternate leaves. Menispermaceæ, 51
Flowers perfect; if climbers, the leaves opposite.
Leaves not peltate; petals deciduous. . Ranunculaceæ, 34
Leaves peltate; petals persistent. Brasenia, in Nymphæaceæ, 55
Pistils several-lobed, the ovaries united below the middle. Resedaceæ, 75
Pistils several, their ovaries cohering in a ring around an axis. Malvaceæ, 96
Pistils strictly one as to the ovary; the styles or stigmas may be several.
Leaves punctate under a lens with transparent dots. Hypericaceæ, 92
Leaves not punctate with transparent dots.
Ovary simple, 1-celled, 2-ovuled. . . . . Rosaceæ, 150
Ovary simple, 1-celled, with one parietal many-ovuled placenta.
Leaves 2–3-ternately compound or dissected. Ranunculaceæ, 34
Leaves peltate, simply lobed. Podophyllum, in Berberidaceæ, 52
Ovary compound, 1-celled, with a central placenta. Portulacaceæ, 90

Ovary compound, 1-celled, with two or more parietal placentæ.
Calyx caducous; juice milky or colored. . . Papaveraceæ, 57
Calyx deciduous, of 4 sepals. . . . . Capparidaceæ, 74
Calyx persistent, of 3 or 5 sepals. . . . . Cistaceæ, 76
Ovary compound, several-celled.
Calyx valvate in the bud, and
Persistent; stamens monadelphous; anthers 1-celled. Malvaceæ, 96
Deciduous; anthers 2-celled . . . . Tiliaceæ, 101
Calyx imbricated in the bud, persistent.
Shrubs; stamens on the base of the petals. Ternstrœmiaceæ, 95
Aquatic or marsh herbs; ovaries many,
On 5 placentæ in the axis. . . . Sarraceniaceæ, 57
On the 8–30 partitions. . . . . Nymphæaceæ, 54

**2.** *Calyx more or less coherent with the surface of the (compound) ovary.*

Ovary 8–30-celled; ovules many, on the partitions; aquatic. Nymphæaceæ, 54
Ovary 10-celled; cells 1-ovuled. . . . Amelanchier, in Rosaceæ, 166
Ovary 2–5-celled.
Leaves alternate, with stipules. . . . Pomeæ, in Rosaceæ, 151
Leaves opposite, without stipules. . . Some Saxifragaceæ, 168
Leaves alternate, without stipules. . . . . Styracaceæ, 333
Ovary 1-celled, with the ovules parietal.
Fleshy plants with no true foliage; petals many. . Cactaceæ, 186
Rough-leaved plants; petals 5 or 10. . . . . Loasaceæ, 193
Ovary one-celled, with the ovules rising from the base. Portulacaceæ, 90

**B.** *Stamens of the same number as the petals and opposite them.*

Pistils 3–6, separate; flowers diœcious; woody vines. Menispermaceæ, 51
Pistil only one.
Ovary one-celled; anthers opening by uplifted valves. Berberidaceæ, 52
Ovary one-celled; anthers not opening by uplifted valves.
Style and stigma one; ovules more than one. . Primulaceæ, 328
Style 1; stigmas 3; sepals 2; ovules several. Portulacaceæ, 90
Style twice or thrice forked; flowers monœcious.
Crotonopsis, in Euphorbiaceæ, 458
Styles 5; ovule and seed only one. . . . Plumbaginaceæ, 327
Ovary 2–4-celled.
Calyx-lobes minute or obsolete; petals valvate. . . Vitaceæ, 112
Calyx 4–5-cleft, valvate in the bud; petals involute. Rhamnaceæ, 111

**C.** *Stamens not more than twice as many as the petals, when of just the number of the petals then alternate with them.*

1. *Calyx free from the ovary, i. e. the ovary wholly superior.*

* *Ovaries 2 or more, separate.*

Stamens united with each other and with a large and thick stigma common to the two ovaries. . . . Asclepiadaceæ, 338
Stamens unconnected, on the receptacle, free from the calyx.
Leaves punctate with pellucid dots. . . . . . Rutaceæ, 106

Leaves not pellucid-punctate.
  Tree, with pinnate leaves. . . Ailanthus, in Simarubaceæ, 107
  Low shrub, with pinnate leaves. Xanthorrhiza, in Ranunculaceæ, 48
  Herbs, not fleshy. . . . . . . . Ranunculaceæ, 34
  Herbs, with thick fleshy leaves. . . . . Crassulaceæ, 176
Stamens unconnected, inserted on the calyx.
  Just twice as many as the pistils (flower symmetrical). Crassulaceæ, 176
  Not just the number or twice the number of the pistils.
    Leaves without stipules. . . . . . Saxifragaceæ, 168
    Leaves with stipules. . . . . . . . Rosaceæ, 150

* * *Ovaries 2 – 5, somewhat united at the base, separate above.*

Leaves punctate with pellucid dots. . . . . . Rutaceæ, 106
Leaves not pellucid-punctate.
  Shrubs or trees with opposite leaves. . . . Sapindaceæ, 115
  Terrestrial herbs; the carpels fewer than the petals. Saxifragaceæ, 168

* * * *Ovaries or lobes of ovary 3 to 5, with a common style.* Geraniaceæ, 102

* * * * *Ovary only one, and*

+ *Simple, with one parietal placenta.* Leguminosæ, 122

+ + *Compound, as shown by the number of cells, placentæ, styles, or stigmas.*

Ovary one-celled.
  Corolla irregular; petals 4; stamens 6. . . . Fumariaceæ, 59
  Corolla irregular; petals and stamens 5. . . . . Violaceæ, 78
  Corolla regular or nearly so.
    Ovule solitary; shrubs or trees; stigmas 3. Anacardiaceæ, 118
    Ovules solitary or few; herbs. . . Some anomalous Cruciferæ, 61
    Ovules more than one, in the centre or bottom of the cell.
      Petals not inserted on the calyx. . . . Caryophyllaceæ, 82
      Petals on the throat of a bell-shaped or tubular calyx. Lythraceæ, 184
    Ovules several or many, on two or more parietal placentæ.
      Leaves punctate with pellucid and dark dots. Hypericaceæ, 92
      Leaves beset with reddish gland-tipped bristles. Droseraceæ, 178
      Leaves neither punctate nor bristly-glandular.
        Sepals 5, very unequal or only 3. . . . Cistaceæ, 76
        Sepals and petals 4; stamens 6. . . Anomalous Cruciferæ, 61
        Sepals and petals 5; stamens 5 or 10.
          Ovary and stamens raised on a stalk. Passifloraceæ, 194
          Ovary sessile. . . . . . . . Saxifragaceæ, 168
Ovary 2 – several-celled.
  Flowers irregular.
    Anthers opening at the top,
      Six or eight and 1-celled; ovary 2-celled, 2-ovuled. Polygalaceæ, 120
      Ten and 2-celled; ovary 5-celled. Rhododendron, in Ericaceæ, 286
    Anthers opening lengthwise.
      Stamens 12 and petals 6 on the throat of a tubular inflated
          or gibbous calyx. . . . Cuphea, in Lythraceæ, 186

Stamens 5 – 8 or 10, and petals hypogynous, or nearly so.

Ovary 3-celled. Sapindaceæ, 115

Ovary 5 celled. Impatiens, &c., in Geraniaceæ, 105

Flowers regular or nearly so.

Stamens neither just as many nor twice as many as the petals,

Triadelphous; petals 5. Hypericaceæ, 92

Tetradynamous (or rarely only 2 or 4); petals 4; pungent herbs. Cruciferæ, 61

Distinct and fewer than the 4 petals. Oleaceæ, 335

Distinct and more numerous than the petals. Sapindaceæ, 115

Stamens just as many or twice as many as the petals.

Ovules and seeds only 1 or 2 in each cell.

Herbs; flowers monœcious or diœcious. Euphorbiaceæ, 451

Herbs; flowers perfect and symmetrical.

Cells of the ovary as many as the sepals, &c. Geraniaceæ, 102

Cells of the (divided) ovary twice as many as the styles, sepals, &c. Linaceæ, 101

Shrubs or trees.

Leaves 3-foliolate, pellucid-punctate. Ptelea, in Rutaceæ, 107

Leaves palmately veined and fruit 2-winged, or pinnate and fruit a berry. Sapindaceæ, 115

Leaves pinnately veined, simple, not punctate.

Calyx not minute; pod colored, dehiscent; seeds enclosed in a pulpy aril. Celastraceæ, 109

Calyx minute; fruit a berry-like drupe. Ilicineæ, 107

Ovules (and usually seeds) several or many in each cell.

Stipules between the opposite and simple leaves. Elatinaceæ, 91

Stipules between the opposite and compound leaves (but they are caducous). Staphylea, in Sapindaceæ, 118

Stipules none when the leaves are opposite.

Stamens 5, monadelphous in a 10-toothed tube or cup; leaves simple, all radical. Galax, in Diapensiaceæ, 326

Stamens 10, monadelphous at the base. Leaflets 3, inversely heart-shaped. Oxalis, in Geraniaceæ, 105

Stamens distinct, free from the calyx.

Style 1, undivided. Ericaceæ, 309

Styles 2 – 5, separate. Caryophyllaceæ, 82

Stamens distinct, inserted on the calyx.

Styles 2 (or 3), or splitting into 2 in fruit. Saxifragaceæ, 168

Style 1; pod in the calyx, 1-celled. Lythraceæ, 184

**2.** *Calyx-tube adherent to the ovary, at least to its lower half.*

Tendril-bearing and often succulent herbs. Cucurbitaceæ, 194

Not tendril-bearing.

Ovules and seeds more than one in each cell.

Ovary 1-celled, many-ovuled from the base. Portulacaceæ, 90

Ovary 1-celled, with 2 or 3 parietal placentæ. Saxifragaceæ, 168

Ovary 2 – several-celled.

Anthers opening by pores at the apex; style 1. Melastomaceæ, 183

Anthers not opening by pores.
Stamens on a flat disk which covers the ovary. Celastraceæ, 109
Stamens inserted on the calyx.
Eight or four (rarely five); style 1. . . Onagraceæ, 186
Five or ten; styles 2–3, distinct. . . Saxifragaceæ, 168
Ovules and seeds only one in each cell.
Stamens 10 or 5 (instead of many), — rarely in Cratægus, in Rosaceæ, 165
Stamens 2 or 8; style 1; stigma 2–4-lobed; herbs. Onagraceæ, 186
Stamens 4 or 8; aquatics; styles or sessile stigmas 4. Halorageæ, 180
Perfect stamens 4; styles 2; shrub. . . Hamamelideæ, 179
Stamens 4; style and stigma 1; chiefly shrubs. . . Cornaceæ, 213
Stamens 5; flowers in umbels, or rarely in heads.
Fruit dry, splitting in two at maturity; styles 2. Umbelliferæ, 198
Fruit berry-like; styles 2–5, separate or united. Araliaceæ, 212

### Division II. GAMOPETALOUS calyx and corolla both present; the latter with its petals united more or less into one piece.

#### **A.** *Stamens more numerous than the lobes of the corolla.*

Ovary 1-celled with one parietal placenta. . . . Leguminosæ, 122
Ovary 1-celled with two parietal placentæ. Adlumia, &c., in Fumariaceæ, 60
Ovary 1-celled with the ovules at the centre or base. . Styracaceæ, 333
Ovary 2-celled with a single ovule in each cell. . . Polygalaceæ, 120
Ovary 3–many-celled.
Stamens free or nearly free from the corolla; style single. Ericaceæ, 309
Stamens free from the corolla; styles 5. Oxalis, in Geraniaceæ, 105
Stamens inserted on the base or tube of the corolla.
Filaments monadelphous; anthers 1-celled, kidney-shaped. Malvaceæ, 96
Filaments 1–5-adelphous at base; anthers 2-celled.
Calyx free from the ovary. . . . . Ternstrœmiaceæ, 95
Calyx coherent with the ovary or with its base. Styracaceæ, 333
Filaments wholly distinct; calyx free, persistent. Ebenaceæ, 333
Filaments in pairs at each sinus; anthers 1-celled. Caprifoliaceæ, 216

#### **B.** *Stamens (fertile ones) as many as the lobes of the corolla and opposite them.*

Ovary 5-celled; corolla appendaged with scales inside. Sapotaceæ, 332
Ovary 1-celled; pod several–many-seeded; style 1. Primulaceæ, 328
Ovary 1-celled; utricle 1-seeded; styles 5. . . Plumbaginaceæ, 327

#### **C.** *Stamens as many as the lobes of the corolla and alternate with them, or fewer.*

##### **1.** *Ovary adherent to the calyx-tube (inferior).*

Tendril-bearing herbs; anthers often united. . . Cucurbitaceæ, 194
Tendrils none.
Stamens united by their anthers into a ring or tube.
Flowers in an involucrate head. . . . . Compositæ, 230
Flowers separate, not involucrate; corolla irregular. Lobeliaceæ, 305
Stamens separate, free from the corolla or nearly so, as many as its lobes: stipules none: juice milky. Campanulaceæ, 307

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|---|---|
| Stamens separate, inserted on the corolla, | |
| One to three, always fewer than the corolla-lobes. | VALERIANACEÆ, 228 |
| Four or five; leaves opposite or whorled. | |
| Ovary 1-celled; flowers in a dense involucrate head. | DIPSACEÆ, 229 |
| Ovary 2–5-celled. | |
| Leaves whorled and without stipules.<br>Leaves opposite or whorled, and with stipules. | RUBIACEÆ, 222 |
| Leaves opposite without stipules (petioles sometimes with stipule-like appendages). | CAPRIFOLIACEÆ, 216 |

2. *Ovary free from the calyx (superior).*

* *Corolla irregular: stamens (with anthers)* 4 *and didynamous, or only* 2.

| | |
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| Ovules and seeds solitary in the (1–4) cells. | |
| Ovary 4-lobed, the style rising from between the lobes. | LABIATÆ, 403 |
| Ovary not lobed, the style from its apex. | VERBENACEÆ, 401 |
| Ovules numerous or at least as many as 2 in each cell. | |
| Ovary and pod 1-celled, | |
| With a free central placenta; stamens 2. | LENTIBULACEÆ, 395 |
| With 2 or more parietal very many-seeded placentæ; stamens 4. | OROBANCHACEÆ, 393 |
| Ovary and fruit more or less 4–5-celled. | PEDALIACEÆ, 399 |
| Ovary and pod 2-celled, but the 2 placentæ parietal. | BIGNONIACEÆ, 398 |
| Ovary and pod 2-celled; placentæ in the axis. | |
| Seeds rarely few, not on hooks, with albumen. | SCROPHULARIACEÆ, 377 |
| Seeds few, borne on hook-like or other projections of the placentæ: no albumen. | ACANTHACEÆ, 399 |

* * *Corolla somewhat irregular: stamens (with anthers)* 5.

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| Stamens free from the corolla; anthers with their cells opening by a hole or chink at the top. | Rhododendron, in ERICACEÆ, 320 |
| Stamens inserted on the corolla. | |
| Ovary deeply 4-lobed around the style. | Echium, in BORRAGINACEÆ, 367 |
| Ovary not lobed; pod many-seeded. | |
| Filaments or some of them woolly. | Verbascum, SCROPHULARIACEÆ, 379 |
| Filaments not woolly. | Hyoscyamus, SOLANACEÆ, 376 |

* * * *Corolla regular.*

+ *Stamens as many as the lobes of the corolla.*

| | |
|---|---|
| Ovaries 2, separate; their | |
| Styles and stigmas also wholly separate. | Dichondra, CONVOLVULACEÆ, 368 |
| Stigmas and sometimes styles united into one. | |
| Filaments distinct; pollen in ordinary grains. | APOCYNACEÆ, 337 |
| Filaments monadelphous; pollen in masses. | ASCLEPIADACEÆ, 338 |
| Ovary one, but deeply 4-lobed around the style (or 2-lobed in Heliotropium). | |
| Leaves alternate. | BORRAGINACEÆ, 360 |
| Leaves opposite. | Mentha, in LABIATÆ, 407 |
| Ovary one; pod 2-lobed or 2-horned at the summit. | LOGANIACEÆ, 345 |
| Ovary one; not deeply lobed, | |
| One-celled, one-ovuled, becoming an achene. | PLANTAGINACEÆ, 422 |

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One-celled, with ovules parietal or on 2 parietal placentæ.
Leaves (or in Menyanthes three leaflets) entire. GENTIANACEÆ, 346
Leaves toothed, lobed, or pinnately compound. HYDROPHYLLACEÆ, 357
Two- to ten-celled.
Leafless parasitic twining plants. Cuscuta, in CONVOLVULACEÆ, 370
Leaves opposite, their bases or petioles connected by stipules or a stipular line. . . . LOGANIACEÆ, 345
Leaves when opposite without stipules.
Stamens free from the corolla or nearly so; style 1. ERICACEÆ, 309
Stamens almost free from the corolla; style none. ILICINEÆ, 107
Stamens in the sinuses of the corolla; style 1. DIAPENSIACEÆ, 326
Stamens inserted on the tube of the corolla,
Four; pod 2-celled, circumscissile. . . PLANTAGINACEÆ, 422
Four; ovary 2–4-celled; ovules solitary. . VERBENACEÆ, 401
Five or rarely more.
Fruit of two or four seed-like nutlets. . BORRAGINACEÆ, 360
Fruit a few-seeded pod.
Calyx 5-cleft; style 3-lobed or -cleft. . POLEMONIACEÆ, 354
Sepals 5; styles 1 or 2, entire or 2-cleft; seeds large, only one or two in a cell. CONVOLVULACEÆ, 367
Fruit a many-seeded pod or berry.
Styles 2. . . . Hydrolea, in HYDROPHYLLACEÆ, 360
Style single. . . . . . . . SOLANACEÆ, 373

+ + *Stamens fewer than the lobes of the corolla.*

Stamens 4, didynamous.
Ovary 2-celled; the cells several-seeded. . . . ACANTHACEÆ, 399
Ovary 2–4-celled; the cells 1-seeded. . . . VERBENACEÆ, 401
Stamens only 2 with anthers; ovary 4-lobed. . Lycopus, in LABIATÆ, 408
Stamens 2, rarely 3; ovary 2-celled.
Low herbs; corolla scarious, withering on the pod. PLANTAGINACEÆ, 422
Herbs; corolla rotate, or somewhat funnelform, and slightly irregular. . . . Veronica, in SCROPHULARIACEÆ, 386
Shrubs or trees; corolla perfectly regular. . . . . OLEACEÆ, 335

## DIVISION III. APETALOUS: corolla (and sometimes calyx) wanting.

### A. *Flowers not in catkins.*

### 1. *Ovary or its cells containing many ovules.*

Ovary and pod inferior (i. e. calyx-tube adherent to the ovary),
Six-celled; stamens 6–12. . . . . . . ARISTOLOCHIACEÆ, 444
Four-celled; stamens 4. . . . . Ludwigia, in ONAGRACEÆ, 187
One-celled, with parietal placentæ. Chrysosplenium, in SAXIFRAGACEÆ, 172
Ovary and pod wholly naked (there being no calyx),
Two-celled, 2-beaked; flowers capitate; tree. . HAMAMELIDEÆ, 179
Two-celled, many-ribbed; aquatic herb. . . . PODOSTEMACEÆ, 444

Ovary and pod superior, i. e. free from the calyx.
Five-celled and 5-beaked, opening across the beaks, which fall off at maturity; stamens 10. Penthorum, in Crassulaceæ, 176
Three-celled and 3-valved, or 3 – 5-celled and circumscissile. Ficoideæ, 198
Two-celled or one-celled; placentæ central.
Stamens inserted on the throat or tube of the calyx. Lythraceæ, 184
Stamens inserted on the receptacle or the base of the calyx,
Alternate with the 5 sepals. . . . Glaux, in Primulaceæ, 331
Opposite the sepals when of the same number. Caryophyllaceæ, 82
One-celled, with one parietal placenta. }
Ovaries 2 or more, separate, simple. } . . . Ranunculaceæ, 34

2. *Ovary or its cells containing only 1 or 2, rarely 3 or 4, ovules.*

* *Pistils more than one, and distinct or nearly so.*

Stamens inserted on the calyx; leaves with stipules. . . Rosaceæ, 150
Stamens inserted on the receptacle.
Leaves punctate with pellucid dots. . Xanthoxylum, in Rutaceæ, 106
Leaves not dotted.
Calyx present, and usually colored or petal-like. Ranunculaceæ, 34
Calyx absent; flowers entirely naked, perfect, spiked. Piperaceæ, 446

* * *Pistil one, either simple or compound.*

Ovary partly inferior, the calyx coherent to its lower half, 2-celled; styles 2; stamens many. . . Hamamelideæ, 179
Ovary wholly inferior (in perfect or pistillate flowers).
Aquatic herbs; ovary 3 – 4-celled, or (Hippuris) 1-celled. Halorageæ, 180
Mostly woody plants; style or stigma one, entire; ovary 1-celled.
Stigma running down one side of the style. Nyssa, in Cornaceæ, 215
Stigma terminal, with or without a style.
Parasitic on the branches of trees; anthers sessile. Loranthaceæ, 449
Not parasitic above ground; anthers on filaments. Santalaceæ, 450
Ovary really free from the calyx, but permanently invested by its tube, or the base of it, so as to seem inferior.
Shrubs, with scurfy leaves; flowers mostly diœcious. Elæagnaceæ, 448
Herbs, with the calyx colored like a corolla.
Leaves opposite, simple. . . . . . Nyctaginaceæ, 425
Leaves alternate, pinnate. . . . Poterium, in Rosaceæ, 161
Ovary plainly free from the calyx, which is sometimes wanting.
Stipules (ocreæ) sheathing the stem at the nodes.
Tree; calyx none; flowers monœcious, in heads. Platanaceæ, 466
Herbs; calyx present and commonly petal-like. Polygonaceæ, 436
Stipules not sheathing the stem, or none.
Aquatic herbs, submerged or nearly so.
Leaves whorled and dissected; style single. Ceratophyllaceæ, 488
Leaves opposite, entire; styles 2; ovary 4-celled. Halorageæ, 180
Not aquatics, herbs.
Ovary 10-celled; berry 10-seeded. . . Phytolaccaceæ, 435
Ovary 3- (rarely 1–2-) celled; juice usually milky. Euphorbiaceæ, 451

Ovary 1-celled; juice not milky.
Style, if any, and stigma only one; leaves simple; no scarious bracts around the flowers. . Urticaceæ, 461
Styles 3; embryo straight; flowers involucrate. Eriogonum, in Polygonaceæ, 436
Style or stigmas 2 or 3; embryo coiled or curved.
Stipules not scarious, leaves palmately cleft or palmately compound. . . Cannabineæ, in Urticaceæ, 461
Stipules scarious (or none); leaves opposite. Illecebraceæ, 426
Stipules none; but flowers with scarious bracts. Amarantaceæ, 427
Stipules and scarious bracts none . . Chenopodiaceæ, 430
Shrubs or trees.
Ovules a pair in each cell of the ovary.
Fruit 2-celled, a double samara. Acerineæ, in Sapindaceæ, 115
Fruit a 1-celled and 1-seeded samara or a drupe. Oleaceæ, 335
Ovules single in each cell of the
Three–nine-celled ovary; leaves heath-like. . Empetraceæ, 487
Three-celled ovary; leaves broad. . . . Rhamnaceæ, 111
One–two-celled ovary; styles or stigmas 2-cleft. Urticaceæ, 461
One-celled ovary; style and stigma single and entire.
Anthers opening longitudinally. . . Thymelæaceæ, 448
Anthers opening by uplifted valves. . . . Lauraceæ, 446

**B.** *Flowers monœcious or diœcious, one or both sorts in catkins.*

**1.** *Only one sort of flowers in catkins or catkin-like heads.*

Fertile flowers in a short catkin, head, or strobile. . . Urticaceæ, 461
Fertile flowers single or clustered; sterile in slender catkins (except in Fagus).
Leaves pinnate; fertile flowers and fruit naked. Juglandaceæ, 467
Leaves simple; fertile flowers 1–3 in an involucre or cup. Cupuliferæ, 470

**2.** *Both sterile and fertile flowers in catkins or catkin-like heads.*

Ovary and pod 2-celled, many-seeded. Liquidambar, in Hamamelideæ, 180
Ovary and pod 1-celled, many-seeded; seeds furnished with a downy tuft at one end. . . . . . Salicaceæ, 480
Ovary 1–2-celled, only one ovule in each cell; fruit 1-seeded.
Parasitic on trees; fruit a berry. . . . . Loranthaceæ, 449
Trees or shrubs, not parasitic.
Calyx regular, in the fertile flower succulent in fruit. Urticaceæ, 461
Calyx none, or rudimentary and scale-like.
Style and stigma one, simple; the flowers in heads. Platanaceæ, 466
Styles or long stigmas 2.
Fertile flowers 2 or 3 at each scale of the catkin. Cupuliferæ, 470
Fertile flowers single under each scale; nutlets naked, waxy-coated or drupe-like. . . . Myricaceæ, 469

Subclass II. GYMNOSPERMÆ. Pistil an open scale or altered leaf, bearing naked ovules on its margin or its upper surface, or in Taxus entirely wanting. Flowers monœcious or diœcious. Coniferæ, 489

## CLASS II. MONOCOTYLEDONOUS PLANTS. (See p. 15.)

**A.** SPADICEOUS DIVISION. *Flowers aggregated on a spadix or fleshy axis, or sometimes scattered, destitute of calyx and corolla (excepting some* Araceæ *and* Naiadaceæ, *where, however, they are on a spadix), and also without glumes (husky scales). Leaves sometimes with netted veins.*

Little floating aquatics, with no distinction of stem and foliage. LEMNACEÆ, 551
Immersed aquatics, branching and leafy. . . . . NAIADACEÆ, 557
Reed-like or Flag-like marsh herbs, with linear and sessile nerved leaves; flowers in spikes or heads.
Flowers monœcious, and quite destitute of floral envelopes. TYPHACEÆ, 547
Flowers perfect, on a lateral spadix; sepals 6. Acorus, in ARACEÆ, 550
Terrestrial or marsh plants; leaves mostly with a distinct netted-veined blade, petioled. . . . . . . ARACEÆ, 548

**B.** PETALOIDEOUS DIVISION. *Flowers not collected on a spadix, furnished with floral envelopes (perianth) answering to calyx or to both calyx and corolla, either herbaceous or colored and petal-like (wholly glumaceous in* Juncaceæ).

**1.** *Perianth adherent to the whole surface of the ovary.*

Flowers diœcious (or rarely perfect), regular.
Aquatics; ovules and seeds several or numerous. HYDROCHARIDACEÆ, 495
Twiners; ovules and seeds one or two in each cell. DIOSCOREACEÆ, 517
Flowers perfect; ovules and seeds usually numerous.
Stamens only one or two; flower irregular, gynandrous. ORCHIDACEÆ, 497
Stamens three.
Anthers introrse, opening transversely. . . BURMANNIACEÆ, 496
Anthers introrse or versatile, opening lengthwise. HÆMODORACEÆ, 512
Anthers extrorse, opening lengthwise. . . . IRIDACEÆ, 513
Stamens 6; flowers usually on a scape from a bulb. AMARYLLIDACEÆ, 515

**2.** *Perianth adherent only to the base or lower half of the ovary.*

Perianth woolly or roughish-mealy; leaves often equitant. HÆMODORACEÆ, 512
Perianth smooth; the leaves grass-like. Stenanthium, etc., in LILIACEÆ, 517

**3.** *Perianth wholly free from the ovary.*

Pistils numerous or few in a head or ring. . . . ALISMACEÆ, 553
Pistil one, compound (cells or placentæ mostly 3).
Perianth not glumaceous or chaffy; flowers not in dense heads.
Stamens 6 (in Maianthemum 4), similar and perfect.
Scurfy-leaved epiphyte; seeds hairy-tufted. . BROMELIACEÆ, 511
Marsh herbs; carpels nearly distinct or separating closed from the axis; seed without albumen. Juncagineæ, in NAIADACEÆ, 557
Terrestrial, not rush-like; seeds with albumen.
Perianth of similar divisions or lobes, mostly colored.
Perianth of 3 foliaceous and green sepals and 3 colored withering-persistent petals. Trillium in } LILIACEÆ, 517
Perianth of 3 persistent green sepals, and 3 ephemeral deliquescent petals. . . . . COMMELINACEÆ, 538

Stamens 6, dissimilar, or only three with perfect anthers.

Sepals 3, herbaceous; ephemeral petals 3, unequal. Commelinaceæ, 538

Perianth tubular, 6-lobed. . . . . . Pontederiaceæ, 535

Stamens 3, similar. Moss-like aquatic. . . . Mayaceæ, 537

Perianth wholly glumaceous, of 6 similar divisions. . Juncaceæ, 539

Perianth partly glumaceous or chaff-like; flowers in very dense heads. Rush-like or aquatic.

Flowers perfect; inner perianth of three yellow petals; perfect stamens and plumose sterile filaments each 3; pod 1-celled, many-seeded on 3 parietal placentæ. Xyridaceæ, 536

Flowers monœcious or diœcious, whitish-bearded; stamens 4 or 3; pod 2–3-celled, 2–3-seeded. . Eriocauleæ, 566

**C.** Glumaceous Division. *Flowers destitute of proper perianth, except sometimes small scales or bristles, but covered by scale-like bracts or glumes.*

Glume a single scale-like bract with a flower in its axil. . Cyperaceæ, 567

Glumes in pairs, of two sorts. . . . . . . Gramineæ, 623

## Class III. CRYPTOGAMOUS ACROGENS. (See p. 17.)

### Subclass I. PTERIDOPHYTES: with woody fibres and vessels.

Spores of only one kind; spore-cases

Borne beneath shield-shaped scales in a terminal spike; stems naked, sheathed at the nodes. . . . . Equisetaceæ, 675

On the back or margin of fronds circinate in vernation. Filices, 678

Bivalvular, in special spikes or panicles; fronds erect in vernation, from short erect rootstocks. . . . Ophioglossaceæ, 693

Solitary in the axils of leaves, 2–3-valved; low long-stemmed moss-like evergreens; leaves small, in 4–16 ranks. Lycopodiaceæ, 695

Spores of two kinds, large and small; spore-cases

Solitary in the axils of small 4-ranked leaves, or in the bases of linear radical leaves. . . . . Selaginellaceæ, 697

Enclosed in peduncled sporocarps; leaves 4-foliolate. Marsiliaceæ, 700

Sporocarps sessile beneath the stem; small, floating, pinnately branched, with minute imbricate leaves. . Salviniaceæ, 701

Subclass II. BRYOPHYTES: with cellular tissue only. [Capsules not operculate, containing spores and usually elaters, in the following Orders.]

Capsule 4-valved, pedicellate; plants leafy-stemmed, rarely thallose. Jungermanniaceæ, 702

Capsule 2-valved or valveless; plants thallose.

Thallus without epidermis; capsule with a columella, short-pedicelled or sessile on the thallus. . . Anthocerotaceæ, 726

Capsules borne beneath a pedunculate receptacle. Marchantiaceæ, 727

Capsules immersed in the thallus or sessile upon it, indehiscent. Ricciaceæ, 730

# ABBREVIATIONS

## OF THE NAMES OF AUTHORS CITED IN THIS VOLUME.

*Adans.* — **Adanson**, Michel.
*Ait.* — **Aiton**, William.
*Ait. f.* — **Aiton**, William Townsend.
*All.* — **Allioni**, Carlo.
*Anders.* — **Andersson**, Nils Johan.
*Arn.* — **Arnott**, George A. Walker.
*Aust.* — **Austin**, Coe Finch.
*Baldw.* — **Baldwin**, William.
*Bart.* — **Barton**, William P. C.
*Beauv.* — **Palisot de Beauvois**, A. M. F. J.
*Benth.* — **Bentham**, George.
*Benth. & Hook.* — G. **Bentham** and J. D. **Hooker**.
*Bernh.* — **Bernhardi**, Johann Jacob.
*Bess.* — **Besser**, Wilhelm S. J. G. von.
*Bieb.* — **Bieberstein**, F. A. M. von.
*Bigel.* — **Bigelow**, Jacob.
*Bisch.* — **Bischoff**, Gottlieb Wilhelm.
*Boeckl.* — **Boeckeler**, Otto.
*Boiss.* — **Boissier**, Edmond.
*Borkh.* — **Borkhausen**, M. B.
*Br.*, *R. Br.* — **Brown**, Robert.
*Britt.* — **Britton**, Nathaniel Lord.
*Carr.* — **Carrière**, Élie Abel.
*Carring.* — **Carrington**, Benjamin.
*Cass.* — **Cassini**, Henri.
*Cav.* — **Cavanilles**, Antonio Jose.
*Cerv.* — **Cervantes**, Vicente.
*Cham.* — **Chamisso**, Adalbert von.
*Chapm.* — **Chapman**, Alvan Wentworth.
*Chois.* — **Choisy**, Jacques Denis.
*Clayt.* — **Clayton**, John.
*Cogn.* — **Cogniaux**, Alfred.
*Coult.* — **Coulter**, John Merle.
*Darl.*, *Darling.* — **Darlington**, William.
*DC.* — **DeCandolle**, Augustin Pyramus.
*A. DC.* — **DeCandolle**, Alphonse.
*Decsne.* — **Decaisne**, Joseph.
*Desf.* — **Desfontaines**, Réné Louiche.
*Desv.* — **Desvaux**, Nicaise Augustin.
*Dicks.* — **Dickson**, James.
*Dill.* — **Dillenius**, Johan Jacob.
*Dougl.* — **Douglas**, David.
*Dufr.* — **Dufresne**, Pierre.
*Dumort.* — **Dumortier**, Barthélemy C.
*Eat.* — **Eaton**, Amos.
*Ehrh.* — **Ehrhart**, Friedrich.
*Ell.* — **Elliott**, Stephen.
*Endl.* — **Endlicher**, Stephan L.
*Engelm.* — **Engelmann**, George.
*Esch.* — **Eschscholtz**, J. F.
*Fisch.* — **Fischer**, F. E. Ludwig von.
*Foug.* — **Fougeroux**, Auguste Denis.
*Forst.* — **Forster**, J. R. and George.
*Froel.* — **Froelich**, Joseph Aloys.
*Gaertn.* — **Gaertner**, Joseph.
*Gaertn. f.* — **Gaertner**, Carl Friedrich.
*Gal.* — **Galeotti**, Henri.
*Gaud.* — **Gaudichaud-Beaupré**, Charles.
*Gey.* — **Geyer**, Charles (Carl Andreas).
*Ging.* — **Gingins de Lassaraz**, F. C. J.
*Glox.* — **Gloxin**, Benjamin Peter.
*Gmel.* — **Gmelin**, Samuel Gottlieb.
*Gooden.* — **Goodenough**, Samuel.
*Grev.* — **Greville**, Robert Kaye.
*Griseb.* — **Grisebach**, Heinrich R. A.
*Gronov.* — **Gronovius**, Jan Fredrik.
*Guss.* — **Gussone**, Giovanni.
*Hack.* — **Hackel**, Eduard.
*Hartm.* — **Hartman**, Carl Johann.
*Hassk.* — **Hasskarl**, Justus Carl.
*Hausskn.* — **Haussknecht**, Carl.
*Haw.* — **Haworth**, Adrian Hardy.
*HBK.* — **Humboldt**, F. Alexander von, Aimé **Bonpland**, and C. S. **Kunth**.
*Hegelm.* — **Hegelmaier**, Friedrich.
*Herb.* — **Herbert**, William.
*Hochst.* — **Hochstetter**, Christian F.
*Hoffm.* — **Hoffman**, Georg Franz.
*Holl.* — **Hollick**, Arthur.

*Hook.* — **Hooker**, William Jackson.
*Hook. f.* — **Hooker**, Joseph Dalton.
*Hornem.* — **Hornemann**, Jens Wilken.
*Huds.* — **Hudson**, William.
*Huebn.* — **Huebener**, J. W. P.
*Jacq.* — **Jacquin**, Nicolaus Joseph.
*Juss.* — **Jussieu**, Antoine Laurent.
*A. Juss.* — **Jussieu**, Adrien de.
*L.*, *Linn.* — **Linnæus**, Carolus, or Carl von **Linné**.
*L. f.* — **Linné**, Carl von (the son).
*L'Her.* — **L'Heritier de Brutelle**, C. L.
*Lag.* — **Lagasca**, Mariano.
*Lam.* — **Lamarck**, J. B. A. P. Monnet.
*Ledeb.* — **Ledebour**, Carl F. von.
*Lehm.* — **Lehmann**, J. G. C.
*Less.* — **Lessing**, Christian Friedrich.
*Light.* — **Lightfoot**, John.
*Lindb.* — **Lindberg**, Sextus Otto.
*Lindenb.* — **Lindenberg**, Johann B. W.
*Lindl.* — **Lindley**, John.
*Loisel.* — **Loiseleur-Deslongchamps**, J. L. A.
*Lour.* — **Loureiro**, Juan.
*Marsh.* — **Marshall**, Humphrey.
*Mart.* — **Martens**, Martin.
*Maxim.* — **Maximowicz**, Carl Johann.
*Medic.* — **Medicus**, Friedrich Casimir.
*Meisn.* — **Meisner**, Carl Friedrich.
*Mey.* — **Meyer**, Ernst (Heinrich F.).
*Mich.* — **Micheli**, Pier' Antonio.
*Michx.* — **Michaux**, André.
*Michx. f.* — **Michaux**, François André.
*Mill.* — **Miller**, Philip.
*Mitch.* — **Mitchell**, J.
*Mitt.* — **Mitten**, William.
*Mont.* — **Montagne**, (J. F.) Camille.
*Moq.* — **Moquin-Tandon**, Alfred.
*Muell.* — **Mueller**, Jean (of Aargau).
*Muhl.* — **Muhlenberg**, Henry (H. Ernst).
*Murr.* — **Murray**, Johann Andreas.
*Neck.* — **Necker**, Noel Joseph de.
*Nutt.* — **Nuttall**, Thomas.
*Pall.* — **Pallas**, Peter Simon.
*Pers.* — **Persoon**, Christian Hendrik.
*Planch.* — **Planchon**, Jules Émile.
*Poir.* — **Poiret**, Jean Louis Marie.
*Poll.* — **Pollich**, Johann Adam.
*R. & S.* — **Roemer**, J. J., and Joseph August **Schultes**.
*Raf.* — **Rafinesque-Schmaltz**, C. S.
*Reichenb.* — **Reichenbach**, H. G. L.
*Richards.* — **Richardson**, John.
*Roem.* — **Roemer**, Johann Jacob.
*Rostk.* — **Rostkovius**, F. W. G.
*Rottb.* — **Rottboell**, Christen Fries.
*St. Hil.* — **St. Hilaire**, Auguste de.
*Salisb.* — **Salisbury**, Richard Anthony.
*Sartw.* — **Sartwell**, Henry P.
*Sav.* — **Savi**, Gaetano.
*Schlecht.* — **Schlechtendal**, D. F. L. von.
*Schleich.* — **Schleicher**, J. C.
*Schleid.* — **Schleiden**, Matthias Jacob.
*Schrad.* — **Schrader**, Heinrich A.
*Schreb.* — **Schreber**, Johann C. D.
*Schum.* — **Schumacher**, Christian F.
*Schwein.* — **Schweinitz**, Lewis David de.
*Scop.* — **Scopoli**, Johann Anton.
*Scribn.* — **Scribner**, F. Lamson.
*Shuttlw.* — **Shuttleworth**, Robert.
*Sibth.* — **Sibthorp**, John.
*Sieb. & Zucc.* — **Siebold**, P. F. von, and J. G. **Zuccarini**.
*Spreng.* — **Sprengel**, Kurt.
*Steph.* — **Stephani**, F.
*Steud.* — **Steudel**, Ernst Gottlieb.
*Sulliv.* — **Sullivant**, William Starling.
*Tayl.* — **Taylor**, Thomas.
*Thuill.* — **Thuillier**, Jean Louis.
*Thunb.* — **Thunberg**, Carl Peter.
*Thurb.* — **Thurber**, George.
*Torr.* — **Torrey**, John.
*Tourn.* — **Tournefort**, Joseph Pitton de.
*Tratt.* — **Trattenick**, Leopold.
*Tuckerm.* — **Tuckerman**, Edward.
*Turcz.* — **Turczaninow**, Nicolaus.
*Underw.* — **Underwood**, Lucien M.
*Vaill.* — **Vaillant**, Sébastien.
*Vent.* — **Ventenat**, Étienne Pierre.
*Vill.* — **Villars**, Dominique.
*Wahl.* — **Wahlenberg**, George.
*Wahlb.* — **Wahlberg**, Pehr Fredrik.
*Walp.* — **Walpers**, Wilhelm Gerhard.
*Walt.* — **Walter**, Thomas.
*Wang.* — **Wangenheim**, F. A. J. von.
*Web.* — **Weber**, Friedrich.
*Wigg.* — **Wiggers**, F. H.
*Willd.* — **Willdenow**, Carl Ludwig.
*Wils.* — **Wilson**, William.
*Wimm.* — **Wimmer**, Friedrich.
*With.* — **Withering**, William.
*Wormsk.* — **Wormskiold**, M. von.
*Wr.* (*Eat. & Wr.*) — **Wright**, John.
*Wulf.* — **Wulfen**, Franz Xaver.

# SIGNS USED IN THIS WORK.

°, ′, ″. The sign of degrees (°) is used for feet; of minutes (′), for inches; of seconds (″), for lines, — the line being the twelfth part of an inch, and very nearly equivalent to two millimetres.

μ. In microscopic measurements, the conventional sign for the micromillimetre or the one-thousandth part of a millimetre = one two-thousandth part of a line.

♂ Bearing only stamens or antheridia.

♀ Pistillate or bearing archegonia.

? A mark of doubt.

! A mark of affirmation or authentication.

Figures or words separated by a short dash (-) indicate the extremes of variation, as "5 - 10″ long, few - many-flowered," i. e. varying from 5 to 10 lines in length, and with from few to many flowers.

# BOTANY

OF THE

# NORTHERN UNITED STATES.

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## SERIES I.

## PHÆNOGAMOUS OR FLOWERING PLANTS.

Vegetables bearing proper flowers, that is, having stamens and pistils, and producing seeds, which contain an embryo.

### Class I. DICOTYLEDONOUS OR EXOGENOUS PLANTS.

Stems formed of bark, wood, and pith; the wood forming a layer between the other two, increasing, when the stem continues from year to year, by the annual addition of a new layer to the outside, next the bark. Leaves netted-veined. Embryo with a pair of opposite cotyledons, or rarely several in a whorl. Flowers having their parts usually in fives or fours.

### Subclass I. ANGIOSPÉRMÆ.

Pistil consisting of a closed ovary, which contains the ovules and forms the fruit. Cotyledons only two.

## DIVISION I. POLYPETALOUS EXOGENOUS PLANTS.

Floral envelopes consisting of both calyx and corolla; the petals not united with each other. (Several genera or species belonging to Polypetalous Orders are destitute of petals, or have them more or less united.)

## ORDER 1. RANUNCULÀCEÆ. (CROWFOOT FAMILY.)

*Herbs or some woody plants, with a colorless and usually acrid juice, polypetalous, or apetalous with the calyx often colored like a corolla, hypogynous; the sepals, petals, numerous stamens, and many or few (rarely single) pistils all distinct and unconnected.* — Flowers regular or irregular. Sepals 3 – 15. Petals 3 – 15, or wanting. Stamens indefinite, rarely few. Fruits either dry pods, or seed-like (achenes), or berries. Seeds anatropous (when solitary and suspended the rhaphe dorsal), with hard albumen and a minute embryo. — Leaves often dissected, their stalks dilated at the base, sometimes with stipule-like appendages. (A large family, including some acrid-narcotic poisons.)

### Synopsis of the Genera.

**Tribe I. CLEMATIDEÆ.** Sepals normally 4, petal-like, valvate in the bud, or with the edges bent inward. Petals none, or small. Achenes numerous, tailed with the feathery or hairy styles. Seed suspended. — Leaves all opposite.

1. **Clematis.** Climbing by the leafstalks, or erect herbs.

**Tribe II. ANEMONEÆ.** Sepals 3 – 20, often petal-like, imbricated in the bud. Stamens mostly numerous. Achenes numerous or several, in a head or spike. — Herbs, never climbing; leaves alternate, or radical, the upper sometimes opposite or whorled.

* Petals none (rarely some staminodia). Seed suspended.

+ All but the lower leaves opposite or whorled Peduncles 1-flowered.

2. **Anemone.** Involucre leaf-like, remote from the flower. Leaves compound or dissected. Pistils very many.
3. **Hepatica.** Involucre close to the flower, of 3 oval bracts, calyx-like. Leaves radical, simple and lobed. Pistils several.
4. **Anemonella.** Stigma terminal, broad and flat. Radical leaves and involucre compound. Peduncles umbellate. Achenes 4 - 15, many-ribbed.

+ + Leaves alternate, compound. Flowers panicled, often diœcious.

5. **Thalictrum.** Sepals usually 4, petal-like or greenish. Achenes few.

* * Petals none. Sepals 3 - 5, caducous. Seed erect. Leaves alternate.

6. **Trautvetteria.** Achenes numerous, inflated, 4-angled. Flowers corymbose. Filaments white, clavate.

* * * Petals evident. Sepals usually 5. Achenes many.

7. **Adonis.** Sepals and petals (5 - 16, crimson or scarlet) flat, unappendaged. Seed suspended.
8. **Myosurus.** Sepals spurred. Petals 5, white. Achenes in a long spike. Scapes 1-flowered. Seed suspended.
9. **Ranunculus.** Petals 5, yellow or white, with a scale or gland at base. Achenes capitate. Seed erect.

**Tribe III. HELLEBOREÆ.** Sepals imbricated in the bud, rarely persistent, petal-like. Petals often nectariferous or reduced to staminodia or none. Pods (follicles) or berries (in n. 20, 21) few, rarely single, few-many-seeded. — Leaves alternate.

* Ovules and commonly seeds more than one pair. Herbs.

+ Flowers regular, not racemose. Petals inconspicuous nectaries or slender or none. Sepals tardily deciduous.

10. **Isopyrum.** Petals none. Sepals broad, white. Pods few. Leaves compound.
11. **Caltha.** Petals none. Sepals broad, yellow. Leaves kidney-shaped, undivided.
12. **Trollius.** Petals 5-20, narrow, pitted above the base. Pods sessile. Leaves palmately lobed.
13. **Coptis.** Petals 5-6, small, hollowed at apex, white. Pods long-stalked. Leaves radical, trifoliolate.
14. **Helleborus.** Petals small, tubular, 2-lipped. Sepals 5, broad, persistent and turning green. Pods sessile.
15. **Eranthis.** Petals small 2-lipped nectaries. Sepals 5-8, narrow, deciduous. Flower solitary, involucrate.

++ Sepals and large spur-shaped petals regular, each 5.

16. **Aquilegia.** Pistils 5, with slender styles. Leaves ternately compound.

+++ Flowers unsymmetrical and irregular. Sepals 5.

17. **Delphinium.** Upper sepal spurred. Petals 4, of two forms; the upper pair with long spurs, enclosed in the spur of the calyx.
18. **Aconitum.** Upper sepal hooded, covering the two long-clawed small petals.

++++ Flowers regular, racemose. Sepals caducous. Petals very small, stamen-like, or none. Leaves decompound.

19. **Cimicifuga.** Flowers in long often paniculate racemes. Pistils 1-8, becoming many-seeded pods.
20. **Actæa.** Flowers in a single short raceme. Pistil single, forming a many-seeded berry.

* * Ovules a single pair. Flowers regular. Roots yellow and bitter.

21. **Hydrastis.** Flowers solitary. Sepals 3, petal-like, caducous. Petals none. Stamens numerous. Pistils several, becoming 2-seeded berries. Leaves simple, lobed.
22. **Xanthorrhiza.** Flowers in compound racemes. Sepals 5. Petals 5, small, 2-lobed, with claws. Stamens 5-10. Pods 1-seeded. Shrub with pinnate leaves.

## 1. CLÉMATIS, L. Virgin's-Bower.

Sepals 4, or rarely more, colored, the valvate margins turned inward in the bud. Petals none or small. Achenes numerous in a head, bearing the persistent styles as naked, hairy, or plumose tails. — Perennial herbs or vines, mostly a little woody, and climbing by the bending or clasping of the leaf-stalks, rarely low and erect. Leaves opposite. (Κληματίs, a name of Dioscorides for a climbing plant with long and lithe branches.)

§ 1. FLÁMMULA. *Flowers cymose-paniculate, rather small, in our species diœcious. Sepals petaloid, whitish, spreading, thin. Petals none. Anthers short, blunt.*

1. **C. Virginiàna,** L. (Common Virgin's-Bower.) Smooth; leaves bearing 3 ovate acute leaflets, which are cut or lobed, and somewhat heart-shaped at the base; tails of the fruit plumose. — River-banks, etc., common, climbing over shrubs. July, August.

2. **C. ligusticifòlia,** Nutt. Very similar, but the leaves 5-foliolate or quinate-ternate. — Long Pine, Neb., and west to the Pacific.

§ 2. VIÓRNA. *Flowers large, solitary on long peduncles, usually nodding. Sepals thick, erect and connivent at base, mostly dull purple. Petals none. Anthers linear.*

+ *Stems climbing; leaves pinnate; calyx (and foliage) glabrous or puberulent.*

3. **C. Viórna,** L. (LEATHER-FLOWER.) Calyx ovate and at length bell-shaped; the purplish *sepals* (1′ long) *very thick and leathery, wholly connivent* or only the tips recurved; long tails of the *fruit very plumose;* leaflets 3 – 7, ovate or oblong, sometimes slightly cordate, 2 – 3-lobed or entire; uppermost leaves often simple. — Rich soil, Penn. to Mo., and southward. May – Aug.

4. **C. Pítcheri,** Torr. & Gray. Calyx bell-shaped; the dull purplish *sepals with narrow and slightly margined recurved points; tails of the fruit filiform and naked or shortly villous;* leaflets 3 – 9, ovate or somewhat cordate, entire or 3-lobed, much reticulated; uppermost leaves often simple. — S. Ind. to Kan., and Tex. June.

5. **C. críspa,** L. Calyx cylindraceous below, the upper half of the bluish-purple *sepals* (1 – 2′ long) *dilated* and widely spreading, with *broad and wavy thin margins; tails of the fruit silky* or glabrate; leaflets 5 – 9, thin, varying from ovate or cordate to lanceolate, entire or 3 – 5-parted. (C. cylindrica, *Sims.*) — Va. near Norfolk, and southward. May – Aug.

+ + *Low and erect, mostly simple; flowers solitary, terminal; leaves sessile or nearly so, undivided, strongly reticulated.*

6. **C. ochroleùca,** Ait. Leaves ovate, entire or sometimes 3-lobed, silky beneath; peduncles long; tails of the fruit very plumose. — Copses, Long Island to Penn. and Ga.; rare. May.

7. **C. Fremónti,** Watson. Leaves crowded, thick, often coarsely toothed, sparingly villous-tomentose; peduncles very short; tails villous or glabrate, not plumose. — Mo. and Kan.

§ 3. ATRÁGENE. *Some of the outer filaments enlarged and more or less petaloid; peduncles bearing single large flowers; the thin sepals widely spreading.*

8. **C. verticillàris,** DC. Woody-stemmed climber, almost glabrous; leaves trifoliolate, with slender common and partial petioles; leaflets ovate or slightly heart-shaped, pointed, entire, or sparingly toothed or lobed; flower bluish-purple, 2 – 3′ across; tails of the fruit plumose. — Rocky places in mountainous districts, Maine and W. New Eng. to Va., Minn., and northwestward; rare. May. — A pair of leaves with a peduncle between them, developed in spring from each of the opposite buds, gives the appearance of a whorl, whence the specific name.

## 2. ANEMÒNE, Tourn. ANÉMONE. WIND-FLOWER.

Sepals few or many, petal-like. Petals none, or in n. 1 resembling abortive stamens. Achenes pointed or tailed, flattened, not ribbed. Seed suspended. — Perennial herbs with radical leaves; those of the stem 2 or 3 together, opposite or whorled, and forming an involucre remote from the flower; peduncles 1-flowered, solitary or umbellate. (The ancient Greek and Latin name, from ἀνεμόω, to be shaken by the wind.)

§ 1. PULSATÌLLA. *Carpels numerous in a head, with long hairy styles which in fruit form feathery tails, as in* Clematis; *flower large, usually with some minute or indistinct gland-like abortive stamens answering to petals.*

1. **A. pàtens,** L., var. **Nuttalliàna,** Gray. (PASQUE-FLOWER.) Villous with long silky hairs; peduncle solitary; flower erect, developed before the leaves, which are ternately divided, the lateral divisions 2-parted, the middle one stalked and 3-parted, the segments deeply once or twice cleft into narrowly linear and acute lobes; lobes of the sessile involucre like those of the leaves, at the base all united into a shallow cup; sepals 5 – 7, purplish or whitish (1 – 1½′ long), spreading when in full anthesis. — Prairies, Ill. and Mo., thence northward and westward. March – April. — A span high. Tail of carpels 2′ long. (Eu., Siberia.)

§ 2. ANEMÒNE proper. *Styles short, not plumose. Staminodia none.*

* *Achenes densely long-woolly, compressed; involucre far below the flower.*

+- *Stem single, from a small tuber; sepals* 10 – 20; *style filiform.*

2. **A. Caroliniàna,** Walt. Stem 3 – 6′ high; root-leaves once or twice 3-parted or cleft; involucre 3-parted, its wedge-shaped divisions 3-cleft; sepals 10 – 20, oblong-linear, purple or whitish; head of fruit oblong. — Ill. to Neb. and southward. May.

+- +- *Stems several; sepals* 5 – 8; *style filiform.*

3. **A. parviflòra,** Michx. Stem 3 – 12′ high from a slender rootstock, 1-flowered; root-leaves 3-parted, their broadly wedge-shaped divisions crenate-incised or lobed; involucre 2 – 3-leaved; sepals 5 or 6, oval, white; head of fruit globular. — Lake Superior, northward and westward. May, June.

4. **A. multífida,** Poir. Stems from a branching caudex, silky-hairy (6 – 12′ high); principal involucre 2 – 3-leaved, bearing one naked and one or two 2-leaved peduncles; leaves of the involucre short-petioled, similar to the root-leaves, twice or thrice 3-parted and cleft, their divisions linear; sepals obtuse, red, sometimes greenish-yellow or whitish; head of fruit spherical or oval. — Rocks, etc., N. E. Maine to Lake Superior, north and westward; rare. June.

+- +- +- *Taller, commonly branching above or producing two or more peduncles; involucral leaves long-petioled; sepals* 5 – 8, *silky or downy beneath* (4 – 6″ *long*), *oval or oblong; style subulate.*

5. **A. cylíndrica,** Gray. (LONG-FRUITED A.) Slender (2° high), silky-pubescent; flowers 2 – 6, on very long upright *naked peduncles;* involucral leaves twice or thrice as many as the peduncles, 3-divided; their divisions *wedge-lanceolate,* the lateral 2-parted, the middle 3-cleft; lobes cut and toothed at the apex; *sepals* 5, *rather obtuse,* greenish-white; *head of fruit cylindrical* (1′ long). — Dry woods, N. Eng. to Mo., and northwestward. May. — Peduncles 7 – 12′ long, all from the same involucre and naked throughout, or one involucellate in the middle.

6. **A. Virginiàna,** L. More loosely pubescent or glabrate; involucral leaves 3, 3-parted; their *divisions ovate-lanceolate,* pointed, cut-serrate, the lateral 2-parted, the middle 3-cleft; peduncles elongated, the earliest naked, the others with a 2-leaved involucel at the middle, repeatedly proliferous; *sepals* 5,

*acute*, greenish (in one variety white and obtuse); *head of fruit oval or oblong.* — Woods and meadows; common. June – August. — Plant 2 – 3° high; the upright peduncles 6 – 12′ long.

* * *Achenes naked, orbicular, compressed, wing-margined; sepals* 5, *obovate; involucre sessile.*

7. **A. Pennsylvánica,** L. Hairy, rather low; primary involucre 3-leaved, bearing a naked peduncle, and soon a pair of branches or peduncles with a 2-leaved involucre at the middle, which branch similarly in turn; their leaves broadly wedge-shaped, 3-cleft, cut and toothed; radical leaves 5 – 7-parted or cleft; sepals white (6 – 9″ long); head of fruit spherical. — W. New Eng. to Penn., Ill., and northwestward. June – Aug.

* * * *Achenes rather few, nearly naked, ovate-oblong; stems slender,* 1-*flowered; leaves radical.*

8. **A. nemoròsa,** L. (WIND-FLOWER. WOOD A.) Low, smoothish; stem perfectly simple, from a filiform rootstock; *involucre of* 3 *long-petioled trifoliolate* leaves, their leaflets wedge-shaped or oblong, and toothed or cut, or the lateral ones (var. QUINQUEFOLIA) 2-parted; a similar radical leaf in sterile plants solitary from the rootstock; peduncle not longer than the involucre; sepals 4 – 7, oval, white, sometimes blue, or tinged with purple outside; carpels only 15 – 20, oblong, with a hooked beak. — Margin of woods. April, May. — A delicate vernal species; the flower 1′ broad. (Eu.)

9. **A. nudicaùlis,** Gray. Glabrous, rootstock filiform; radical leaves reniform, 3-parted, the divisions broadly cuneate with rounded crenate-incised or -lobed summit; involucre of a single similar petiolate leaf or wanting; achenes glabrous, tipped with a slender-subulate hooked style. — North shore of Lake Superior near Sand Bay, Minn., in bogs. (*Joseph C. Jones.*) Imperfectly known.

### 3. HEPÁTICA, Dill. LIVER-LEAF. HEPATICA.

Involucre simple and 3-leaved, very close to the flower, so as to resemble a calyx; otherwise as in Anemone. — Leaves all radical, heart-shaped and 3-lobed, thickish and persistent through the winter, the new ones appearing later than the flowers, which are single, on hairy scapes. (Name from a fancied resemblance to the liver in the shape of the leaves.)

1. **H. tríloba,** Chaix. Leaves with 3 ovate obtuse or rounded lobes; those of the involucre also obtuse; sepals 6 – 12, blue, purplish, or nearly white; achenes several, in a small loose head, ovate-oblong, pointed, hairy. — Woods; common from the Atlantic to Mo., Minn., and northward, flowering soon after the snow leaves the ground in spring. (Eu.)

2. **H. acutíloba,** DC. Leaves with 3 ovate and pointed lobes, or sometimes 5-lobed; those of the involucre acute or acutish. — Passes into the other and has the same range.

### 4. ANEMONÉLLA, Spach.

Involucre compound, at the base of an umbel of flowers. Sepals 5 – 10, white and conspicuous. Petals none. Achenes 4 – 15, ovoid, terete, strongly 8 – 10-ribbed, sessile. Stigma terminal, broad and depressed. — Low glabrous perennial; leaves all radical, compound.

1. **A. thalictroides,** Spach. (RUE-ANEMONE.) Stem and slender petiole of radical leaf (a span high) rising from a cluster of thickened tuberous roots; leaves 2–3-ternately compound; leaflets roundish, somewhat 3-lobed at the end, cordate at the base, long-petiolulate, those of the 2–3-leaved 1–2-ternate involucre similar; flowers several in an umbel; sepals oval (½′ long, rarely pinkish), not early deciduous. (Thalictrum anemonoides, *Michx.*) — Woods, common, flowering in early spring with Anemone nemorosa, and considerably resembling it. Rarely the sepals are 3-lobed like the leaflets.

## 5. THALÍCTRUM, Tourn. MEADOW-RUE.

Sepals 4–5, petal-like or greenish, usually caducous. Petals none. Achenes 4–15, grooved or ribbed, or else inflated. Stigma unilateral. Seed suspended. — Perennials, with alternate 2–3-ternately compound leaves, the divisions and the leaflets stalked; petioles dilated at base. Flowers in corymbs or panicles, often polygamous or diœcious. (Derivation obscure.)

∗ *Flowers diœcious or sometimes polygamous, in ample panicles; filaments slender; stigmas elongated, linear or subulate; achenes sessile or short-stipitate, ovoid, pointed, strongly several-angled and grooved.*

1. **T. diòicum,** L. (EARLY MEADOW-RUE.) Smooth and pale or glaucous, 1–2° high; leaves (2–3) all with general petioles; leaflets drooping, rounded and 3–7-lobed; flowers purplish and greenish, diœcious; the yellowish anthers linear, mucronate, drooping on fine capillary filaments. — Rocky woods, etc.; common. April, May.

2. **T. polýgamum,** Muhl. (TALL M.) Smooth, not glandular, 4–8° high; stem-leaves sessile; leaflets rather firm, roundish to oblong, commonly with mucronate lobes or tips, sometimes puberulent beneath; panicles very compound; flowers white, the fertile ones with some stamens; anthers not drooping, small, oblong, blunt, the mostly white filaments decidedly thickened upwards. (T. Cornuti, *Man.*, not *L.*) — Wet meadows and along rivulets, N. Eng. to Ohio and southward; common. July–Sept.

3. **T. purpuráscens,** L. (PURPLISH M.) Stem (2–4° high) usually purplish; stem-leaves sessile or nearly so; leaflets more veiny and reticulated beneath, with or without gland-tipped or glandless hairs or waxy atoms; panicles compound; flowers (sepals, filaments, etc.) greenish and purplish, diœcious; anthers linear or oblong-linear, mucronulate, drooping on capillary filaments occasionally broadened at the summit. — Dry uplands and rocky hills, S. New Eng. to Minn., and southward. May, June.

∗ ∗ *Flowers all perfect, corymbed; the filaments strongly club-shaped or inflated under the small and short anther; stigma short; achenes gibbous, long-stipitate.*

4. **T. clavàtum,** DC. Size and appearance of n. 1; leaves only twice ternate; flowers white, fewer; achenes 5–10, flat, somewhat crescent-shaped, tapering into the slender stipe. — Mountains of Va. and southward. June.

## 6. TRAUTVETTÈRIA, Fisch. & Mey. FALSE BUGBANE.

Sepals 3–5, usually 4, concave, petal-like, very caducous. Petals none. Achenes numerous, capitate, membranaceous, compressed-4-angled and inflated. Seed erect. — A perennial herb, with alternate palmately-lobed leaves, and corymbose white flowers. (For *Prof. Trautvetter*, a Russian botanist.)

1. **T. palmàta,** Fisch. & Mey. Stems 2 – 3° high; root-leaves large, 5 – 11-lobed, the lobes toothed and cut. — Moist ground along streamlets, Md. to S. Ind., and south to Ga.

## 7. ADÒNIS, Dill.

Sepals and petals (5 – 16) flat, unappendaged, deciduous. Achenes numerous, in a head, rugose-reticulated. Seed suspended. — Herbs with finely dissected alternate leaves and showy flowers. (Ἄδωνις, a favorite of Venus, after his death changed into a flower.)

**A.** AUTUMNÀLIS, L. A low leafy annual, with scarlet or crimson flowers, darker in the centre. — Sparingly naturalized from Europe.

## 8. MYOSÙRUS, Dill. MOUSE-TAIL.

Sepals 5, spurred at the base. Petals 5, small and narrow, raised on a slender claw, at the summit of which is a nectariferous hollow. Stamens 5 – 20. Achenes numerous, somewhat 3-sided, crowded on a very long and slender spike-like receptacle (whence the name, from *μῦς, a mouse,* and *οὐρά, a tail*), the seed suspended. — Little annuals, with tufted narrowly linear-spatulate root-leaves, and naked 1-flowered scapes. Flowers small, greenish.

1. **M. mínimus,** L. Fruiting spike 1 – 2′ long; achenes quadrate, blunt. — Alluvial ground, Ill. and Ky., thence south and west. (Eu.)

## 9. RANÚNCULUS, Tourn. CROWFOOT. BUTTERCUP.

Sepals 5. Petals 5, flat, with a little pit or scale at the base inside. Achenes numerous, in a head, mostly flattened, pointed; the seed erect. — Annuals or perennials; stem-leaves alternate. Flowers solitary or somewhat corymbed, yellow, rarely white. (Sepals and petals rarely only 3, the latter often more than 5. Stamens occasionally few.) — (A Latin name for a little frog; applied by Pliny to these plants, the aquatic species growing where frogs abound.)

**R.** FICÀRIA, L. (representing the § *Ficaria*), which has tuberous-thickened roots, Caltha-like leaves, and scape-like peduncles bearing a 3-sepalous and 8 – 9-petalous yellow flower, has been found as an escape from gardens about New York and Philadelphia.

§ 1. BATRÁCHIUM. *Petals with a spot or naked pit at base, white, or only the claw yellow; achenes marginless, transversely wrinkled; aquatic or subaquatic perennials, with the immersed foliage repeatedly dissected* (*mostly by threes*) *into capillary divisions; peduncles* 1-*flowered, opposite the leaves.*

* *Receptacle hairy.*

1. **R. circinàtus,** Sibth. (STIFF WATER-CROWFOOT.) *Leaves* all under water and *sessile,* with broad conspicuous stipules, the divisions and subdivisions short, spreading in one roundish plane, *rigid, not collapsing when withdrawn from the water.* (R. divaricatus, *Man.,* not *Schrank.*) — Ponds and slow streams, Maine and Vt., to Iowa, north and westward, much rarer than the next. June – Aug. (Eu.)

2. **R. aquátilis,** L., var. **trichophýllus,** Gray. (COMMON WHITE WATER-CROWFOOT.) *Leaves* all under water and mostly *petioled,* their capillary divisions and subdivisions *rather long and soft, usually collapsing more or less when withdrawn from the water;* petiole rather narrowly dilated. — Com-

mon, especially in slow-flowing waters, the eastern form with more soft and flaccid leaves. June – Aug. (Eu.)

Var. **cæspitòsus,** DC. A dwarf terrestrial form, rooting at the nodes, the small leaves somewhat fleshy, with broader rigid divisions. — S. Ill. (*Schneck*), and westward.

* * *Receptacle glabrous; no submersed leaves.*

**R.** HEDERÀCEUS, L. Rooting freely in shallow water; leaves all reniform, angulate-lobed. — Fresh-water marshes at Norfolk, Va. (Nat. from Eu.)

§ 2. HALÒDES. *Petals yellow, with nectariferous pit and scale; carpels thin-walled, striate, in an oblong head; scapose, spreading by runners.*

3. **R. Cymbalària,** Pursh. (SEA-SIDE CROWFOOT.) Glabrous; scapes 1 – 6′ high, 1 – 7-flowered; leaves clustered at the root and on the joints of the long rooting runners, roundish-heart-shaped or kidney-shaped, crenate, rather fleshy, long-petioled; petals 5 – 8. — Sandy shores, from New Jersey northward, and along the Great Lakes to Ill., Kan. and westward; also at salt springs. June – Aug.

§ 3. RANUNCULUS proper. *Petals with a little scale at the base, yellow; achenes nerveless.*

* *Achenes smooth; mostly perennial.*

+ *Aquatic; immersed leaves filiformly dissected, as in* § Batrachium.

4. **R. multífidus,** Pursh. (YELLOW WATER-CROWFOOT.) Stems floating or immersed, with the leaves all repeatedly 3-forked into long filiform divisions, or sometimes creeping in the mud (perennial by rooting from the nodes, if at all); emersed leaves with shorter and linear or wedge-shaped divisions, or else kidney-shaped and sparingly lobed or toothed; petals 5 – 8, deep bright yellow, 4 – 6″ long, much larger than the calyx; carpels in a round head, pointed with a straight beak. — E. New Eng. to S. Penn., Mo., and northward. May – July. — Out of water it is often pubescent, especially in

Var. **terréstris,** Gray. Stem rooting in the mud or ascending from the base; leaves all smaller, coarsely dissected, round-reniform in outline; flowers and fruit twice or thrice smaller. — N. Ohio to N. Ill., Minn., and westward.

+ + *Terrestrial but growing in very wet places, glabrous or nearly so; leaves entire or barely toothed, all or else all but the lowest lanceolate or linear; carpels forming a globular head.* (SPEARWORT.)

5. **R. ámbigens,** Watson. (WATER PLANTAIN SPEARWORT.) Stems ascending (1 – 2° high), often rooting from the lower joints; leaves lanceolate or the lowest oblong, mostly denticulate (3 – 5′ long), contracted into a margined half-clasping petiole; petals 5 – 7, bright yellow, oblong (2 – 3″ long); *carpels flattened, large* (1″ long), *pointed with a long narrow-subulate beak.* (R. alismæfolius, *Man.*, not *Gey.*) — N. Eng. to Ont., Minn. and southward; common, especially at the north. June – Aug.

6. **R. Flámmula,** L. (SMALLER SPEARWORT.) Stem reclining or ascending, rooting below, leaves lanceolate or linear, or the lowest ovate-oblong to lanceolate, entire or nearly so, mostly petioled (1 – 2′ long), petals 5 – 7, much longer than the calyx, bright yellow, *carpels small, flattish but turgid, mucronate with a short abrupt point.* — Only a small form (var. INTER-

MÈDIUS) met with in this country (shore of L. Ontario, and northward), a span high, with flowers 3 – 5″ in diameter, passing into

Var. **réptans,** E. Meyer. (CREEPING S.) Small, slender, the *filiform creeping stems rooting at all the joints;* leaves linear, spatulate, or oblong (¼ – 1′ long); flowers small. — Gravelly or sandy banks; Newf. to Penn., north and westward. June – Sept. (Eu.)

7. **R. oblongifòlius,** Ell. Usually annual; stem erect or ascending, often pubescent below, slender (1 – 2° high), *diffusely branched above and many-flowered; leaves serrate or denticulate,* lower long-petioled, ovate or oblong (½ – 1½′ long), uppermost linear; flowers 3 – 5″ broad; *petals* 5, bright yellow, 1 – 3″ long; *carpels* minute, almost *globular,* the small style deciduous. — Wet prairies, Ill., Mo., and in S. States. June.

8. **R. pusíllus,** Poir. Stem ascending, weak, loosely branching (6 – 18′ long); *leaves entire* or obscurely denticulate, the lowest round-ovate or heart-shaped (½′ long), long-petioled, the upper oblong or lanceolate (1 – 1½′ long); *flowers very small; petals* 1 – 5, *yellowish;* stamens 3 – 10; carpels very turgid, smooth or slightly papillose, tipped with a minute sessile stigma. — Wet places, S. New York, and southward along the coast. June – Aug.

+ + + *Terrestrial, but often in wet places; leaves mostly cleft or divided.*

++ *Root-leaves not divided to the very base; achenes marginless.*

9. **R. affìnis,** R. Br. Somewhat hairy or glabrous; low or slender, 1° high or less; leaves pedately cleft, the cauline with linear or narrow oblanceolate divisions; petals light yellow, 3 – 4″ long or smaller; *heads oblong; achenes turgid,* with small and mostly recurved style, pubescent or glabrous. — And var. VALIDUS, Gray, stouter and with more fleshy leaves, the lower mostly undivided and roundish, cordate, truncate or cuneate at base, coarsely crenate or more or less cleft. — Minn., Iowa, north and westward.

10. **R. rhomboídeus,** Goldie. Low (3 – 8′ high), *hairy; root-leaves roundish or rhombic-ovate,* rarely subcordate, toothed or crenate; lowest stem-leaves similar or 3 – 5-lobed, the upper 3 – 5-parted, almost sessile, the lobes linear; *carpels* orbicular *with a minute beak,* in a globose head; *petals large,* deep yellow. — Prairies, Mich. to N. Ill., Minn., and northward. April, May.

11. **R. abortìvus,** L. (SMALL-FLOWERED C.) Biennial, *glabrous,* branching, 6′ – 2° high; primary *root-leaves round heart-shaped or kidney-form,* barely crenate, the succeeding often 3-lobed or 3-parted; those of the stem and branches 3 – 5-parted or divided, subsessile, the divisions oblong or narrowly wedge-form, mostly toothed; head globose; *carpels mucronate, with a minute curved beak; petals pale yellow, shorter than the small reflexed calyx.* — Shady hillsides and along brooks, common. April – June.

Var. **micránthus,** Gray. *Pubescent,* roots often fusiform-thickened; root-leaves seldom at all heart-shaped, some 3-parted or 3-divided; peduncles more slender and carpels fewer. — E. Mass. to Ill., Minn., and westward.

12. **R. sceleràtus,** L. (CURSED C.) Annual, glabrous; *root-leaves 3-lobed,* rounded; lower stem-leaves 3-parted, the lobes obtusely cut and toothed, the uppermost almost sessile, with the lobes oblong-linear and nearly entire; *carpels barely mucronulate,* very numerous, *in oblong or cylindrical*

*heads; petals scarcely exceeding the calyx.* — Wet ditches; appearing as if introduced. June – Aug. — Stem thick and hollow, 1° high; juice acrid and blistering; leaves thickish; flowers small, pale yellow. (Eu.)

++ ++ *Leaves variously cleft or divided; achenes in globular heads* (*except* n. 17), *compressed, with an evident firm margin; hirsute or pubescent.*

= *Achenes with long recurved beak; root-leaves rarely divided.*

13. **R. recurvàtus,** Poir. (HOOKED C.) Hirsute, 1 – 2° high; leaves of the root and stem nearly alike, long-petioled, deeply 3-cleft, large; the lobes broadly wedge-shaped, 2 – 3-cleft, cut and toothed toward the apex; petals shorter than the reflexed calyx, pale. — Woods, common. May, June.

= = *Style long and attenuate, stigmatose at the tip, persistent or the upper part usually deciduous; early root-leaves only 3-parted, the later 3 – 5-foliolate; petals bright yellow.*

14. **R. fasciculàris,** Muhl. (EARLY C.) Low, ascending, 5 – 9′ high, pubescent with close-pressed silky hairs; *root a cluster of thickened fleshy fibres; radical leaves appearing pinnate*, the long-stalked terminal division remote from the sessile lateral ones, itself 3 – 5-divided or parted and 3 – 5-cleft, the lobes oblong or linear; petals often 6 or 7, spatulate-oblong, twice the length of the spreading calyx; *carpels scarcely margined*, tipped with a slender straight or rather curved beak. — Dry or moist hills. April, May.

15. **R. septentrionàlis,** Poir. Low, hairy or nearly glabrous; *stems ascending, or in wet ground some of them procumbent or forming long runners;* leaves 3-divided, the divisions all stalked (or at least the terminal one), broadly wedge-shaped or ovate, unequally 3-cleft or parted and variously cut, never pinnately compound; petals obovate, much larger than the spreading calyx; *carpels strongly margined*, pointed by a stout straightish beak. (R. repens, of *Manual*, mainly.) — Moist or shady places, etc., May – Aug. — Extremely variable in size and foliage, commencing to flower by upright stems in spring before any long runners are formed.

= = = *Style subulate, stigmatose along the inner margin, mostly persistent.*

16. **R. rèpens,** L. In habit and foliage closely similar to the last species; leaves frequently white-variegated or spotted; commencing to flower somewhat later. — In low grounds; generally in waste grounds near the coast and probably introduced from Europe, but indigenous westward.

17. **R. Pennsylvánicus,** L. f. (BRISTLY C.) Stout and erect from a usually annual root, hirsute with widely spreading bristly hairs, leafy to the top, 1 – 2° high; leaves all ternately divided or compound, the stalked leaflets unequally 3-cleft, sharply cut and toothed, acute; flowers inconspicuous; calyx reflexed; head of carpels oblong. — Wet places, common. June – Aug.

18. **R. hìspidus,** Hook. (not Michx. or DC.). Resembling the last, but the ascending or reclining stems few-leaved, rarely if ever rooting, not always hirsute; petals (about 3″ long) surpassing the hardly reflexed and soon deciduous calyx; achenes with a stout straight beak, in a globose or oval head. — On the northern shore of Lake Superior, and north and westward; probably in N. Minn.

**R.** BULBÒSUS, L. (BULBOUS C. OR BUTTERCUPS.) Hairy; *stem erect from a bulb-like base*, 1° high; radical leaves 3-divided; *the lateral divisions sessile, the terminal stalked* and 3-parted, all wedge-shaped, cleft and toothed; peduncles furrowed; petals round, wedge-shaped at base; calyx reflexed; carpels tipped with a very short beak. — Fields; very abundant only in E. New England; rare westward. May – July. — Leaves appearing as if pinnate. Petals often 6 or 7, deep glossy yellow, the corolla more than an inch broad. (Nat. from Eu.)

**R.** ÀCRIS, L. (TALL C. OR BUTTERCUPS.) Hairy; stem erect (2 – 3° high); leaves 3-divided; *the divisions all sessile* and 3-cleft or parted, their segments cut into lanceolate or linear crowded lobes; peduncles not furrowed; petals obovate, much longer than the spreading calyx. — Fields; common, especially eastward. June – Aug. — Flower nearly as large as the last, but not so deep yellow. — The *Buttercups* are avoided by cattle, on account of their very acrid or even blistering juice, which property, however, is dissipated in drying when these plants are cut with hay. (Nat. from Eu.)

* * *Achenes beset with rough points or small prickles; annuals.*

**R.** MURICÀTUS, L. Nearly glabrous; lower leaves roundish or reniform, 3-lobed, coarsely crenate; the upper 3-cleft, wedge-form at the base; *petals longer than the calyx; carpels flat, spiny-tuberculate* on the sides, strongly beaked, surrounded with a wide and sharp smooth margin. — Eastern Virginia and southward. (Nat. from Eu.)

**R.** PARVIFLÒRUS, L. Hairy, slender and diffuse; lower leaves roundish-cordate, 3-cleft, coarsely toothed or cut; the upper 3 – 5-parted; *petals not longer than the calyx; carpels minutely hispid and rough*, beaked, narrowly margined. — Norfolk, Va., and southward. (Nat. from Eu.)

## 10. ISOPỲRUM, L.

Sepals 5, petal-like, deciduous. Petals 5, minute, wanting in the American species. Stamens 10 – 40. Pistils 3 – 6 or more, pointed with the styles. Pods ovate or oblong, 2 – several seeded. — Slender smooth perennial herbs, with 2 – 3-ternately compound leaves; the leaflets 2 – 3-lobed. Flowers axillary and terminal, white. (From ἰσόπυρον, the ancient name of a Fumaria.)

1. **I. biternàtum,** Torr. & Gray. Petals none; filaments white, club-shaped; pistils 3 – 6 (commonly 4), divaricate in fruit, 2 – 3-seeded; seeds smooth. — Moist shady places, Ohio to Minn. and southward. May. — Fibres of the root thickened here and there into little tubers. Aspect and size of the plant much as in Anemonella.

## 11. CÁLTHA, L. MARSH MARIGOLD.

Sepals 5 – 9, petal-like. Petals none. Pistils 5 – 10, with scarcely any styles. Pods (follicles) compressed, spreading, many-seeded. — Glabrous perennials, with round and heart-shaped or kidney-form, large, undivided leaves. (An ancient Latin name for the common Marigold.)

1. **C. palústris,** L. Stem hollow, furrowed; leaves round or kidney-shaped, either crenate or dentate or nearly entire; sepals broadly oval (bright yellow). — Swamps and wet meadows, common northward. April, May. — Often called incorrectly *Cowslips;* used as a pot-herb in spring, when coming into flower. C. FLABELLIFOLIA, Pursh, is a weak slender form, with open-reniform leaves and smaller flowers (1′ broad or less), occurring in cold mountain springs, N. Y. to Md. (Eu.)

### 12. TRÓLLIUS, L. Globe-flower.

Sepals 5 – 15, petal-like. Petals numerous, small, 1-lipped, the concavity near the base. Stamens and pistils numerous. Pods 9 or more, sessile, many-seeded. — Smooth perennials with palmately parted and cut leaves, like Ranunculus, and large solitary terminal flowers. (Name thought to be derived from the old German word *troll*, a globe, or something round.)

1. **T. láxus,** Salisb. (Spreading Globe-flower.) Leaves 5 – 7-parted; sepals 5 – 6, spreading; petals 15 – 25, inconspicuous, much shorter than the stamens. — Deep swamps, N. H. to Del. and Mich. May. — Flowers twice the size of the common Buttercup; the sepals spreading, so that the name is not appropriate, as it is to the *European Globe-flower* of the gardens, nor is the blossom showy, being pale greenish-yellow, or nearly white.

### 13. CÓPTIS, Salisb. Goldthread.

Sepals 5 – 7, petal-like, deciduous. Petals 5 – 7, small, club-shaped, hollow at the apex. Stamens 15 - 25. Pistils 3 – 7, on slender stalks. Pods divergent, membranaceous, pointed with the style, 4 – 8-seeded. — Low smooth perennials, with ternately divided root-leaves, and small white flowers on scapes. (Name from *κόπτω*, *to cut*, alluding to the divided leaves.)

1 **C. trifòlia,** Salisb (Three-leaved Goldthread.) Leaflets 3, obovate-wedge-form, sharply toothed, obscurely 3-lobed, scape 1-flowered. — Bogs, abundant northward; extending south to Maryland along the mountains, and west to Iowa. May. — Root of long, bright yellow, bitter fibres. Leaves evergreen, shining. Scape naked, slender, 3 – 5′ high. (Eu.)

### 14. HELLÉBORUS, Tourn. Hellebore.

Sepals 5, petal-like or greenish, persistent. Petals 8 – 10, very small, tubular, 2-lipped. Pistils 3 – 10, sessile, forming coriaceous many-seeded pods. — Perennial herbs, with ample palmate or pedate leaves, and large, solitary, nodding, early vernal flowers. (An ancient name of unknown meaning.)

**H.** víridis, L. (Green Hellebore.) Root-leaves glabrous, pedate; calyx spreading, greenish. — Has been found wild on Long Island, in Penn., and W Va. (Adv. from Eu.)

### 15. ERÁNTHIS, Salisb. Winter Aconite.

Sepals 5 – 8, petal-like, deciduous. Petals small 2-lipped nectaries. Carpels few, stipitate, several-seeded. — Perennial herbs, with palmately multifid radical leaves, the scape bearing a single large yellow flower surrounded by an involucre of a single leaf. (Name from *ἦρ*, *spring*, and *ἄνθος*, *flower*.)

**E.** hyemàlis, Salisb. Dwarf; flowers cup-shaped, 1½′ in diameter; petals shorter than the stamens. — Near Philadelphia. (Adv. from Eu.)

### 16. AQUILÈGIA, Tourn. Columbine.

Sepals 5, regular, colored like the petals. Petals 5, all alike, with a short spreading lip, produced backward into large hollow spurs, much longer than the calyx. Pistils 5, with slender styles. Pods erect, many-seeded. — Perennials, with 2 – 3-ternately compound leaves, the leaflets lobed. Flowers large and showy terminating the branches. (Name from *aquilegus*, water-drawing.)

1. **A. Canadénsis,** L. (WILD COLUMBINE.) Spurs nearly straight; stamens and styles longer than the ovate sepals. — Rocks, common. April – June. — Flowers 2′ long, scarlet, yellow inside (or rarely all over), nodding, so that the spurs turn upward, but the stalk becomes upright in fruit.

2. **A. brevístyla,** Hook. Flowers small, blue or purplish or nearly white; spurs incurved. — Red River valley, Dak.; Rocky Mts., northward.

A. VULGÀRIS, L., the common GARDEN COLUMBINE, of Europe, with hooked spurs, is beginning to escape from cultivation in some places.

### 17. DELPHÍNIUM, Tourn. LARKSPUR.

Sepals 5, irregular, petal-like; the upper one prolonged into a spur at the base. Petals 4, irregular, the upper pair continued backward into long spurs which are enclosed in the spur of the calyx, the lower pair with short claws; rarely only 2, united into one. Pistils 1 – 5, forming many-seeded pods in fruit. — Leaves palmately divided or cut. Flowers in terminal racemes. (Name from *Delphin*, in allusion to the shape of the flower, which is sometimes not unlike the classical figures of the dolphin.)

* *Perennials, indigenous; pistils* 3.

1. **D. exaltàtum,** Ait. (TALL LARKSPUR.) Stem slender, 2 – 5° high; leaves deeply 3 – 5-cleft, the divisions narrow wedge-form, diverging, 3-cleft at the apex, acute; *racemes wand-like,* panicled, *many-flowered;* flowers purplish-blue, downy; spur straight; *pods erect.* — Rich soil, Penn. to Minn. and southward. July.

2. **D. tricórne,** Michx. (DWARF L.) Leaves deeply 5-parted, their divisions unequally 3 – 5-cleft; the lobes linear, acutish; *raceme few-flowered, loose;* spur straightish, ascending; *pods strongly diverging.* — W. Penn. to Minn. and southward. April, May. — Root a tuberous cluster. Stem simple, 6′ – 3° high. Flowers bright blue, sometimes white, occasionally numerous.

3. **D. azùreum,** Michx. Leaves deeply 3 – 5-parted, the divisions 2 – 3 times cleft; the lobes all narrowly linear; *raceme strict;* spur ascending, usually curved upward; *pods erect.* — Wisc. to Dak. and southward. May, June. — Stem 1 – 2° high, slender, often softly pubescent. Flowers sky-blue or whitish.

* * *Annual, introduced; petals* 2, *united into one body; pistil single.*

**D.** CONSÓLIDA, L. (FIELD L.) Leaves dissected into narrow linear lobes; inflorescence loosely paniculate; pedicels shorter than the bracts; pod glabrous. — Old grain-fields, Penn. and Va.; also sparingly along roadsides farther north. (Nat. from Eu.)

**D.** AJÀCIS, L. Flowers more numerous and spicately racemose; pods pubescent. — Sparingly escaped from gardens in E. Atlantic States. (Nat. from Eu.)

### 18. ACONÌTUM, Tourn. ACONITE. MONKSHOOD. WOLFSBANE.

Sepals 5, petal-like, very irregular; the upper one (helmet) hooded or helmet-shaped, larger than the others. Petals 2 (the 3 lower wanting entirely, or very minute rudiments among the stamens), consisting of small spur-shaped bodies raised on long claws and concealed under the helmet. Pistils 3 – 5. Pods several-seeded. Seed-coat usually wrinkled or scaly. — Perennials, with palmately cleft or dissected leaves, and showy flowers in racemes or panicles. (The ancient Greek and Latin name, of uncertain origin.)

1. **A. Noveboracénse,** Gray. Erect from tuberous-thickened roots, 2° high, leafy, *the summit and* strict loosely flowered *raceme pubescent;* leaves rather deeply parted, the broadly cuneate divisions 3-cleft and incised; flowers blue, *the helmet gibbous-obovate* with broad rounded summit and short descending beak. — Chenango and Orange Cos., N. Y.

2. **A. uncinàtum,** L. (WILD MONKSHOOD.) Glabrous; *stem slender, from tuberous-thickened roots, erect,* but weak and disposed to climb; *leaves firm, deeply* 3–5-*lobed,* petioled, the lobes ovate-lanceolate, coarsely toothed; *flowers blue; helmet erect, obtusely conical,* compressed, slightly beaked in front. — Rich shady soil along streams, Penn., and southward in the mountains; Wisc. June–Aug.

3. **A. reclinàtum,** Gray. (TRAILING WOLFSBANE.) Glabrous; stems trailing (3–8° long); *leaves deeply* 3–7-*cleft,* petioled, the lower orbicular in outline; the divisions wedge-form, incised, often 2–3-lobed; *flowers white,* in very loose panicles; *helmet soon horizontal, elongated-conical,* with a straight beak in front. — Cheat Mountain, Va., and southward in the Alleghanies. Aug. — Lower leaves 5–6′ wide. Flowers 9″ long, nearly glabrous.

## 19. CIMICÍFUGA, L. BUGBANE.

Sepals 4 or 5, falling off soon after the flower expands. Petals, or rather transformed stamens, 1–8, small, on claws, 2-horned at the apex. Stamens as in Actæa. Pistils 1–8, forming dry dehiscent pods in fruit. — Perennials, with 2–3-ternately-divided leaves, the leaflets cut-serrate, and white flowers in elongated wand-like racemes. (Name from *cimex,* a bug, and *fugo,* to drive away.)

§ 1. CIMICIFUGA proper. *Pistils* 3–8, *stipitate; seeds flattened laterally, covered with chaffy scales, in one row in the membranaceous pods; style awl-shaped; stigma minute.*

1. **C. Americàna,** Michx. (AMERICAN BUGBANE.) Stem 2–4° high; racemes slender, panicled, ovaries mostly 5, glabrous; pods flattened, veiny, 6–8-seeded. — Mountains of S. Penn. and southward. Aug.–Sept.

§ 2. MACRÒTYS. *Pistil solitary, sometimes* 2–3, *sessile; seeds smooth, flattened and packed horizontally in the pod in two rows, as in* Actæa; *stigma broad and flat.*

2. **C. racemòsa,** Nutt. (BLACK SNAKEROOT. BLACK COHOSH.) Stem 3–8° high, from a thick knotted rootstock; racemes in fruit becoming 1–3° long; pods ovoid. — Rich woods, Maine to Wisc., and southward. July. — Var. DISSÉCTA, Gray. Leaves irregularly pinnately decompound, the rather small leaflets incised. — Centreville, Del. (*Commons.*)

## 20. ACTÆA, L. BANEBERRY. COHOSH.

Sepals 4 or 5, falling off when the flower expands. Petals 4–10, small, flat, spatulate, on slender claws. Stamens numerous, with slender white filaments. Pistil single; stigma sessile, depressed, 2-lobed. Fruit a many-seeded berry.

Seeds smooth, flattened, and packed horizontally in 2 rows. — Perennials, with ample 2–3-ternately compound leaves, the ovate leaflets sharply cleft and toothed, and a short and thick terminal raceme of white flowers. (From ἀκτέα, *actæa*, ancient names of the elder, transferred by Linnæus.)

1. **A. spicàta,** L., var. **rùbra,** Ait. (Red Baneberry.) *Raceme ovate; petals rhombic-spatulate, much shorter than the stamens; pedicels slender; berries cherry-red*, or sometimes white, oval. — Rich woods, common, especially northward. April, May. — Plant 2° high. (Eu.)

2. **A. álba,** Bigel. (White Baneberry.) Leaflets more incised and sharply toothed; *raceme oblong; petals slender*, mostly truncate at the end, appearing to be transformed stamens; *pedicels thickened in fruit*, as large as the peduncle and red, the globular-oval *berries white.* — Rich woods, flowering a week or two later than the other, and more common westward and southward. — White berries rarely occur with slender pedicels, also red berries with thick pedicels; but these are perhaps the result of crossing.

## 21. HYDRÁSTIS, Ellis. Orange-root. Yellow Puccoon.

Sepals 3, petal-like, falling away when the flower opens. Petals none. Pistils 12 or more in a head, 2-ovuled; stigma flat, 2-lipped. Ovaries becoming a head of crimson 1–2-seeded berries in fruit. — A low perennial herb, sending up in early spring, from a thick and knotted yellow rootstock, a single radical leaf and a simple hairy stem, which is 2-leaved near the summit and terminated by a single greenish-white flower. (Name unmeaning.)

1. **H. Canadénsis,** L. (Golden Seal, etc.) Leaves rounded, heart-shaped at the base, 5–7-lobed, doubly serrate, veiny, when full grown in summer 4–9′ wide. — Rich woods, N. Y. to Minn., and southward.

## 22. XANTHORRHÌZA, Marshall. Shrub Yellow-root.

Sepals 5, regular, spreading, deciduous. Petals 5, much smaller than the sepals, concave and obscurely 2-lobed, raised on a claw. Stamens 5 to 10. Pistils 5–15, with 2 pendulous ovules. Pods 1-seeded, oblong, the short style becoming dorsal. — A low shrubby plant; the bark and long roots deep yellow and bitter. Flowers polygamous, brown purple, in compound drooping racemes, appearing along with the 1–2-pinnate leaves from large terminal buds in early spring. (Name compounded of ξανθός, *yellow*, and ῥίζα, *root.*)

1. **X. apiifòlia,** L'Her. Stems clustered, 1–2° high; leaflets cleft and toothed. — Shady banks of streams, Penn. to S. W. New York and Ky., and south in the mountains. The rootstocks of this, and also of the last plant, were used as a yellow dye by the aborigines.

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Nigélla Damascèna, L., the Fennel-flower, which offers a remarkable exception in having the pistils partly united into a compound ovary, so as to form a several-celled capsule, grows nearly spontaneously around gardens.

## ORDER 2. MAGNOLIÀCEÆ. (MAGNOLIA FAMILY.)

*Trees or shrubs, with the leaf-buds covered by membranous stipules, polypetalous, hypogynous, polyandrous, polygynous; the calyx and corolla colored alike, in three or more rows of three, and imbricated (rarely convolute) in the bud.* — Sepals and petals deciduous. Anthers adnate. Pistils many, mostly packed together and covering the prolonged receptacle, cohering with each other, and in fruit forming a sort of fleshy or dry cone. Seeds 1 or 2 in each carpel, anatropous; albumen fleshy; embryo minute. — Leaves alternate, not toothed, marked with minute transparent dots, feather-veined. Flowers single, large. Bark aromatic and bitter.

### 1. MAGNÒLIA, L.

Sepals 3. Petals 6–9. Stamens imbricated, with very short filaments, and long anthers opening inward. Pistils coherent, forming a fleshy and rather woody cone-like red fruit; each carpel at maturity opening on the back, from which the 1 or 2 berry-like seeds hang by an extensile thread composed of unrolled spiral vessels. Inner seed-coat bony. — Buds conical, the coverings formed of the successive pairs of stipules, each pair enveloping the leaf next above, which is folded lengthwise and applied straight against the side of the next stipular sheath, and so on. (Named after *Magnol*, Professor of Botany at Montpellier in the 17th century.)

* *Leaves all scattered along the branches; leaf-buds silky.*

1. **M. glaùca**, L. (SMALL OR LAUREL MAGNOLIA. SWEET BAY.) *Leaves* oval to broadly lanceolate, 3–6′ long, *obtuse, glaucous beneath; flower globular, white*, 2′ long, *very fragrant;* petals broad; cone of fruit small, oblong. — Swamps, from near Cape Ann and N. Y. southward, near the coast; in Penn. as far west as Cumberland Co. June–Aug. — Shrub 4–20° high, with thickish leaves, which farther south are evergreen.

2. **M. acuminàta**, L. (CUCUMBER-TREE.) *Leaves thin, oblong, pointed, green* and a little pubescent beneath, 5–10′ long; *flower oblong bell-shaped, glaucous-green* tinged with yellow, 2′ long; cone of fruit 2–3′ long, cylindrical. — Rich woods, western N. Y. to Ill., and southward. May, June. — Tree 60–90° high. Fruit when young slightly resembling a small cucumber, whence the common name.

3. **M. macrophýlla**, Michx (GREAT-LEAVED MAGNOLIA.) *Leaves obovate-oblong, cordate* at the narrowed base, pubescent and *white beneath; flower open bell-shaped, white, with a purple spot at base;* petals ovate, 6′ long; cone of fruit ovoid. — S. E. Ky. and southward. May, June. — Tree 20–40° high. Leaves 1–3° long, somewhat clustered on the flowering branches.

* * *Leaves crowded on the summit of the flowering branches in an umbrella-like circle; leaf-buds glabrous: flowers white, slightly scented.*

4. **M. Umbrélla**, Lam. (UMBRELLA-TREE.) *Leaves obovate-lanceolate, pointed at both ends*, soon glabrous, 1–2° long; petals obovate-oblong, 4–5′ long. — S. Penn. to Ky. and southward. May. — A small tree. Fruit rose-color, 4–5′ long, ovoid-oblong

5. **M. Fràseri,** Walt. (EAR-LEAVED UMBRELLA-TREE.) *Leaves oblong-obovate or spatulate, auriculate at the base,* glabrous, 8–20′ long; petals obovate-spatulate, with narrow claws, 4′ long. — Va. and Ky., along the Alleghanies, and southward. April, May. — A slender tree 30–50° high. Flower more graceful and cone of fruit smaller than in the preceding.

### 2. LIRIODÉNDRON, L. TULIP-TREE.

Sepals 3, reflexed. Petals 6, in two rows, making a bell-shaped corolla. Anthers linear, opening outward. Pistils flat and scale-form, long and narrow, imbricating and cohering together in an elongated cone, dry, separating from each other and from the long and slender axis in fruit, and falling away whole, like a samara or key, indehiscent, 1–2-seeded in the small cavity at the base. Buds flat, sheathed by the successive pairs of flat and broad stipules joined at their edges, the folded leaves bent down on the petiole so that the apex points to the base of the bud. (Name from λίριον, *lily* or *tulip*, and δένδρον, *tree*.)

1. **L. Tulipífera,** L. — Rich soil, S. New Eng. to Mich., Wisc., and southward. May, June. — A most beautiful tree, sometimes 140° high and 8–9° in diameter in the Western States, where it is wrongly called WHITE POPLAR. Leaves very smooth, with 2 lateral lobes near the base, and 2 at the apex, which appears as if cut off abruptly by a broad shallow notch. Petals 2′ long, greenish-yellow marked with orange. Cone of fruit 3′ long.

## ORDER 3. ANONÀCEÆ. (CUSTARD-APPLE FAMILY.)

*Trees or shrubs, with naked buds and no stipules, a calyx of* 3 *sepals, and a corolla of* 6 *petals in two rows, valvate in the bud, hypogynous, polyandrous.* — Petals thickish. Anthers adnate, opening outward; filaments very short. Pistils several or many, separate or cohering in a mass, fleshy or pulpy in fruit. Seeds anatropous, large, with a crustaceous seed-coat, and a minute embryo at the base of the *ruminated* albumen. — Leaves alternate, entire, feather-veined. Flowers axillary, solitary. — A tropical family, excepting the following genus: —

### 1. ASÍMINA, Adans. NORTH AMERICAN PAPAW.

Petals 6, increasing after the bud opens; the outer set larger than the inner. Stamens numerous in a globular mass. Pistils few, ripening 1–4 large and oblong pulpy several seeded fruits. Seeds horizontal, flat, enclosed in a fleshy aril. — Shrubs or small trees with unpleasant odor when bruised; the lurid flowers solitary from the axils of last year's leaves. (Name from *Asiminier*, of the French colonists, from the Indian name *assimin*.)

1. **A. tríloba,** Dunal. (COMMON PAPAW.) Leaves thin, obovate-lanceolate, pointed; petals dull-purple, veiny, round-ovate, the outer ones 3–4 times as long as the calyx. — Banks of streams in rich soil, western N. Y. and Penn. to Ill., S. E. Neb., and southward. April, May. — Tree 10–20° high; the young shoots and expanding leaves clothed with a rusty down, soon glabrous. Flowers appearing with the leaves, 1½′ wide. Fruits 3–4′ long, yellowish, sweet and edible in autumn.

## ORDER 4. MENISPERMÀCEÆ. (MOONSEED FAMILY.)

*Woody climbers, with palmate or peltate alternate leaves, no stipules, the sepals and petals similar, in three or more rows, imbricated in the bud; hypogynous, diœcious, 3–6-gynous; fruit a 1-seeded drupe, with a large or long curved embryo in scanty albumen.* — Flowers small. Stamens several. Ovaries nearly straight, with the stigma at the apex, but often incurved in fruiting, so that the seed and embryo are bent into a crescent or ring. — Chiefly a tropical family.

* Sepals and petals present. Anthers 4-celled. Seed incurved.

1. **Cocculus.** Stamens, petals, and sepals each 6.
2. **Menispermum.** Stamens 12–24, slender. Petals 6–8.

* * Petals none. Anthers 2-celled. Seed saucer-shaped.

3. **Calycocarpum.** Stamens in the sterile flowers 12; in the fertile flowers 6, abortive.

### 1. CÓCCULUS, DC.

Sepals, petals, and stamens 6, alternating in threes, the two latter short. Anthers 4-celled. Pistils 3–6 in the fertile flowers; style pointed. Drupe and seed as in Menispermum. — Flowers in axillary racemes or panicles. (An old name, a diminutive of *coccus*, *κόκκος*, a berry.)

1. **C. Carolinus,** DC. Minutely pubescent; leaves downy beneath, ovate or cordate, entire or sinuately or hastately lobed, variable in shape; flowers greenish, the petals in the sterile ones auriculate-inflexed below around the filaments; drupe red (as large as a small pea). — River-banks, Va. to S. Ill., Kan., and southward. July, Aug.

### 2. MENISPÉRMUM, L. MOONSEED.

Sepals 4–8. Petals 6–8, short. Stamens 12–24 in the sterile flowers, as long as the sepals; anthers 4-celled. Pistils 2–4 in the fertile flowers, raised on a short common receptacle; stigma broad and flat. Drupe globular, the mark of the stigma near the base, the ovary in its growth after flowering being strongly incurved, so that the (wrinkled and grooved) laterally flattened stone takes the form of a large crescent or ring. The slender embryo therefore is horseshoe-shaped; cotyledons filiform. — Flowers white, in small and loose axillary panicles. (Name from *μήνη*, *moon*, and *σπέρμα*, *seed*.)

1. **M. Canadénse,** L. Leaves peltate near the edge, 3–7-angled or lobed. — Banks of streams; common. June, July. — Drupes black with a bloom, ripe in September, looking like frost grapes.

### 3. CALYCOCÁRPUM, Nutt. CUPSEED.

Sepals 6, petaloid. Petals none. Stamens 12 in the sterile flowers, short; anthers 2-celled. Pistils 3, spindle-shaped, tipped with a radiate many-cleft stigma. Drupe globular; the thin crustaceous putamen hollowed out like a cup on one side. Embryo foliaceous, heart-shaped. — Flowers greenish-white, in long racemose panicles. (Name from *κάλυξ*, *a cup*, and *καρπός*, *fruit*.)

1. **C. Lyòni,** Nutt. Leaves large, thin, deeply 3–5-lobed, cordate at the base; the lobes acuminate; drupe an inch long, black when ripe; the shell

crested-toothed on the edge of the cavity. — Rich soil, Ky. to S. Ill. and Kan., and southward. May. — Stems climbing to the tops of trees.

## ORDER 5. BERBERIDÀCEÆ. (BARBERRY FAMILY.)

*Shrubs or herbs, with the sepals and petals both imbricated in the bud, usually in two rows of* 3 (*rarely* 2 *or* 4) *each; the hypogynous stamens as many as the petals and opposite to them; anthers opening by* 2 *valves or lids hinged at the top.* (Podophyllum is an exception, and Jeffersonia as respects the sepals in one row.) *Pistil single.* Filaments short. Style short or none. Fruit a berry or a pod. Seeds few or several, anatropous, with albumen. Embryo small, except in Berberis. Leaves alternate, with dilated bases or stipulate.

* Petals and stamens 6. Fruit few-seeded.

1. **Berberis.** Shrubs, with yellow flowers and wood; a pair of glandular spots on the base of each petal. Fruit a berry.
2. **Caulophyllum.** Herb, with greenish flowers; petals thick, much shorter than the sepals. Ovary soon bursting; the two seeds left naked.
3. **Diphylleia.** Herb with white flowers; petals much longer than the sepals. Berry 2-4-seeded.

* * Petals 6-9. Stamens 8-18. Fruit many-seeded. Herbs.

4. **Jeffersonia.** Petals and stamens usually 8; anthers opening by uplifted valves. Pod opening by a lid.
5. **Podophyllum.** Petals 6-9. Stamens 12-18; anthers not opening by uplifted valves. Fruit a large berry.

### 1. BÉRBERIS, L. BARBERRY.

Sepals 6, roundish, with 2-6 bractlets outside. Petals 6, obovate, concave, with two glandular spots inside above the short claw. Stamens 6. Stigma circular, depressed. Fruit a 1-few-seeded berry. Seeds erect, with a crustaceous integument. — Shrubs, with yellow wood and inner bark, yellow flowers in drooping racemes, sour berries, and 1-9-foliolate leaves. Stamens irritable. (Derived from *Berbêrys*, the Arabic name of the fruit.)

1. **B. Canadénsis**, Pursh. (AMERICAN BARBERRY.) Leaves repandly toothed, the teeth less bristly-pointed; *racemes few-flowered;* petals notched at the apex; *berries oval;* otherwise as in the next. — Alleghanies of Va. and southward; *not* in Canada. June. — Shrub 1-3° high.

**B.** VULGÀRIS, L. (COMMON BARBERRY.) Leaves scattered on the fresh shoots of the season, mostly reduced to sharp triple or branched spines, from the axils of which the next season proceed rosettes or fascicles of obovate-oblong closely bristly-toothed leaves (the short petiole jointed!), and drooping *many-flowered racemes;* petals entire; *berries oblong,* scarlet. — Thickets and waste grounds in E. New Eng., where it has become thoroughly wild; elsewhere occasionally spontaneous. May, June. (Nat. from Eu.)

### 2. CAULOPHÝLLUM, Michx. BLUE COHOSH.

Sepals 6, with 3 or 4 small bractlets at the base, ovate-oblong. Petals 6 thick and gland-like somewhat kidney-shaped or hooded bodies, with short claws, much smaller than the sepals, one at the base of each of them. Stamens 6; anthers oblong. Pistil gibbous; style short; stigma minute and unilateral;

ovary bursting soon after flowering by the pressure of the 2 erect, enlarging seeds, and withering away; the spherical seeds naked on their thick seed-stalks, looking like drupes, the fleshy integument turning blue; albumen horny. — A perennial glabrous herb, with matted knotty rootstocks, sending up in early spring a simple and naked stem, terminated by a small raceme or panicle of yellowish-green flowers, and a little below bearing a large triternately compound sessile leaf (whence the name, from καυλός, *stem*, and φύλλον, *leaf*, the stem seeming to form a stalk for the great leaf.)

1. **C. thalictroides,** Michx. (Also called Papoose-root.) Stems 1–2½° high; leaflets obovate wedge-form, 2–3-lobed, a smaller biternate leaf often at the base of the panicle; flowers appearing while the leaf is yet small. — Deep rich woods; common westward. April, May. — Whole plant glaucous when young, as also the seeds, which are as large as peas.

### 3. DIPHYLLÈIA, Michx. Umbrella-leaf.

Sepals 6, fugacious. Petals 6, oval, flat, larger than the sepals Stamens 6; anthers oblong. Ovary oblong; style hardly any; stigma depressed. Ovules 5 or 6, attached to one side of the cell below the middle. Berry globose, few-seeded. Seeds oblong, with no aril. — A perennial glabrous herb, with thick horizontal rootstocks, sending up each year either a huge centrally peltate and cut-lobed, rounded, umbrella-like radical leaf, on a stout stalk, or a flowering stem bearing two similar (but smaller and more 2-cleft) alternate leaves which are peltate near one margin, and terminated by a cyme of white flowers. (Name composed of δίς, *double*, and φύλλον, *leaf*.)

1. **D. cymòsa,** Michx. Root-leaves 1–2° in diameter, 2-cleft, each division 5–7-lobed; lobes toothed; berries blue. — Wet or springy places, mountains of Va. and southward. May.

### 4. JEFFERSÒNIA, Barton. Twin-leaf.

Sepals 4, fugacious. Petals 8, oblong, flat. Stamens 8, anthers oblong-linear, on slender filaments. Ovary ovoid, soon gibbous, pointed, stigma 2-lobed. Pod pear-shaped, opening half-way round horizontally, the upper part making a lid. Seeds many in several rows on the lateral placenta, with a fleshy lacerate aril on one side. — A perennial glabrous herb, with matted fibrous roots, long-petioled root-leaves, parted into 2 half-ovate leaflets, and simple naked 1-flowered scapes. (Named in honor of *Thomas Jefferson*.)

1. **J. diphýlla,** Pers. Low; flower white, 1′ broad, the parts rarely in threes or fives. — Woods, western N. Y. to Wisc. and southward. April, May. — Called *Rheumatism-root* in some places.

### 5. PODOPHÝLLUM, L. May-Apple. Mandrake.

Flower-bud with three green bractlets, which early fall away Sepals 6, fugacious. Petals 6 or 9, obovate. Stamens twice as many as the petals in our species; anthers linear-oblong, not opening by uplifted valves Ovary ovoid; stigma sessile, large, thick and undulate. Fruit a large fleshy berry. Seeds covering the very large lateral placenta, in many rows, each seed enclosed in a pulpy aril, all forming a mass which fills the cavity of the fruit. — Perennial herbs, with creeping rootstocks and thick fibrous roots. Stems

2-leaved, 1-flowered. (Name from ποῦς, *a foot*, and φύλλον, *a leaf*, probably referring to the stout petioles.)

1. **P. peltàtum**, L. Stamens 12–18; leaves 5–9-parted, the lobes oblong, rather wedge-shaped, somewhat lobed and toothed at the apex. — Rich woods, common. May. — Flowerless stems terminated by a large round 7–9-lobed leaf, peltate in the middle like an umbrella. Flowering stems bearing two one-sided leaves, with the stalk fixed near their inner edge; the nodding white flower from the fork nearly 2′ broad. Fruit ovoid, 1–2′ long, ripe in July, sweet and slightly acid, edible. The leaves and roots are drastic and poisonous! — Found occasionally with from 2 to 6 carpels!

## ORDER 6. NYMPHÆÀCEÆ. (WATER-LILY FAMILY.)

*Aquatic perennial herbs, with horizontal rootstocks and peltate or sometimes only cordate leaves floating or emersed; the ovules borne on the sides or back (or when solitary hanging from the summit) of the cells, not on the ventral suture; the embryo enclosed in a little bag* at the end of the albumen next the hilum, except in Nelumbium, which has no albumen. Radicle hardly any; cotyledons thick and fleshy, enclosing a well-developed plumule. — Flowers axillary, solitary. Vernation involute. Rootstocks apparently endogenous. — The few genera differ so much in the flower and fruit that they are separated into the three following suborders.

SUBORDER I. **Cabómbeæ.** Sepals and petals each 3 or sometimes 4, hypogynous and persistent. Stamens definite (3–18). Pistils 2–18, free and distinct, coriaceous and indehiscent, 1–3-seeded on the dorsal suture. — Stems slender, leafy, coated with mucilage. Flowers small.

1. **Cabomba.** Stamens 3–4. Carpels 2–3. Submersed leaves capillary-multifid.
2. **Brasenia.** Stamens 12–18. Carpels 4–18. Leaves all peltate.

SUBORDER II. **Nelumbòneæ.** Sepals and petals numerous in several rows, passing gradually into each other, and with the indefinitely numerous stamens hypogynous and deciduous. Pistils several, 1-ovuled, separately immersed in the obconical receptacle, which is much enlarged and broadly top-shaped at maturity, the imbedded nut-like fruits resembling small acorns. Embryo large; no albumen. — Petioles and peduncles all from the tuberous rootstock, the centrally peltate leaves and the flowers large.

3. **Nelumbo.** Character of the Suborder.

SUBORDER III. **Nymphæaceæ** proper. Sepals 4–6, and petals numerous in many rows, persistent or decaying away, either hypogynous or variously adnate to the surface of the compound 8–30-celled ovary, which is formed by the union of as many carpels; the numerous ovules inserted over the whole inner face of the cells, except at the ventral suture. Stigmas radiate as in Poppy. Fruit baccate, with a firm rind. Petioles and peduncles from a thick rootstock.

4. **Nymphæa.** Petals adnate to the ovary, large; the stamens on its summit.
5. **Nuphar.** Petals (very small and stamen-like) and stamens inserted under the ovary.

### 1. CABÓMBA, Aublet.

Sepals 3. Petals 3, oval, bi-auriculate above the very short claw. Stamens 3–6; anthers short, extrorse. Pistils 2–4, with small terminal stigmas. Seeds 3, pendulous. — Slender, mainly submersed, with opposite or verticillate capillary-dissected leaves, a few floating, alternate and centrally peltate. Flowers single on long axillary peduncles. (Probably an aboriginal name.)

1. **C. Caroliniàna**, Gray. Floating leaves linear-oblong or -obovate, often with a basal notch; flowers 6–8″ broad, white with yellow spots at base; stamens 6. — Ponds, S. Ill. (May–Sept., *Schneck*) to Fla. and Tex.

### 2. BRASÈNIA, Schreber. WATER-SHIELD.

Sepals 3 or 4. Petals 3 or 4, linear, sessile. Stamens 12–18; filaments filiform; anthers innate. Pistils 4–18, forming little club-shaped indehiscent pods; stigmas linear. Seeds 1–2, pendulous on the dorsal suture! — Rootstock creeping. Leaves alternate, long-petioled, centrally peltate, oval, floating. Flowers axillary, small, dull-purple. (Name of uncertain origin.)

1. **B. peltàta**, Pursh. Leaves entire, 1–4′ across. — Ponds and slow streams. June–Aug. (Asia, Africa and Australia.)

### 3. NELÚMBO, Tourn. SACRED BEAN.

The only genus of the suborder. (*Nelumbo* is the Ceylonese name of the East Indian species, the pink-flowered N. speciosa.)

1. **N. lùtea**, Pers. (YELLOW NELUMBO, or WATER CHINQUAPIN.) Leaves usually raised high out of the water, circular, with the centre depressed or cupped, 1–2° in diameter; flower pale yellow, 5–10′ broad; anthers tipped with a slender hooked appendage. (Nelumbium luteum, *Willd.*) — S. Conn. (probably of Indian introduction) to Lake Ontario, Mich., Minn., E. Neb., and southward; rare in the Middle States. — Tubers farinaceous and edible. Seeds also eatable. Embryo like that of Nymphæa on a large scale; cotyledons thick and fleshy, enclosing a plumule of 1 or 2 well-formed young leaves, enclosed in a delicate stipule-like sheath.

### 4. NYMPHÆA, Tourn. WATER-NYMPH. WATER-LILY.

Sepals 4, green outside, nearly free. Petals numerous, in many rows, the innermost gradually passing into stamens, imbricately inserted all over the ovary. Stamens indefinite, inserted on the ovary, the outer with dilated filaments. Ovary 12–35-celled, the concave summit tipped with a globular projection at the centre, around which are the radiate stigmas; these project at the margin, and are extended into linear and incurved sterile appendages. Fruit depressed-globular, covered with the bases of the decayed petals, maturing under water. Seeds enveloped by a sac-like aril. — Flowers white, pink, yellow, or blue, very showy. (Dedicated by the Greeks to the Water-Nymphs.)

1. **N. odoràta**, Ait. (SWEET-SCENTED WATER-LILY.) *Rootstock with few and persistent branches;* leaves orbicular, cordate-cleft at the base to the petiole (5–9′ wide), the margin entire; stipules broadly triangular or almost kidney-shaped, notched at the apex, appressed to the rootstock; *flower* white, *very sweet scented* (often as much as 5½′ in diameter when fully expanded, opening early in the morning, closing in the afternoon); petals obtuse; anthers

blunt; aril much longer than the distinctly stipitate *oblong seeds* (these about $1\frac{1}{2}''$ long). — Ponds and still or slow-flowing water; common. June – Sept. — Varies with pinkish-tinged and rarely with bright pink-red flowers (especially at Barnstable, Mass.), the leaves often crimson underneath, — and in size by gradations into

Var. **minor,** Sims, with leaves only 2 – 5′ and flowers 2 – 3′ broad. — Shallow water, in cold bogs and in sandy soil.

2. **N. renifórmis,** DC. (TUBER-BEARING W.) Leaves reniform-orbicular, mostly larger (8 – 15′ wide) and more prominently ribbed than the last, rarely purplish beneath; *rootstock bearing numerous spontaneously detaching often compound tubers; flower scentless* (or with a slight odor as of apples), white, never pinkish, $4\frac{1}{2}$ – 9′ in diameter, the petals proportionally broader and blunter than in n. 1; the fruit more depressed, and with fewer but much larger (i. e. twice as broad) *globular-ovoid seeds,* which when mature are barely enclosed by the aril and not stipitate. (N. tuberosa, *Paine.*) — Lakes, slow rivers, etc., western N. Y. (from Oneida Lake, *Paine*) and near Meadville, Penn., to Mich., E. Neb., and probably in the Southern States. July – Sept.

### 5. NÙPHAR, Smith. YELLOW POND-LILY. SPATTER-DOCK.

Sepals 5, 6, or sometimes more, colored, or partly green outside, roundish, concave. Petals numerous, small and thickish, stamen-like or scale-like, inserted with the very numerous short stamens on the receptacle under the ovary, not surpassing the disk-like 8 – 24-rayed sessile stigma, persistent and at length recurved. Fruit ovoid, naked, usually ripening above water. Aril none. — Rootstock creeping, cylindrical. Leaves with a deep sinus at the base. Flowers yellow or sometimes tinged with purple, produced all summer (Name said to be of Arabic origin.)

1. **N. ádvena,** Ait. f. *Sepals* 6, *unequal; petals shorter than the stamens* and resembling them, thick and fleshy, truncate; stigma nearly entire, 12 – 24-rayed, pale red; ovary and fruit ($1\frac{1}{2}'$ long) ovate, not contracted above into a narrow neck; thin submersed leaves seldom present; floating or emersed and erect leaves thick (6 – 12′ long), from roundish to ovate or almost oblong, the sinus open, or closed or narrow. — Very common, in still or stagnant water; stout and coarse; flower often partly purplish (var. VARIEGÀTUM, Engelm.).

Var. **minus,** Morong. More slender; leaves somewhat smaller (3 – 8′ long); flowers usually smaller (sepals 12 – 15″ long); petals spatulate; stigmas 9 – 13-rayed, crenately toothed, bright red or crimson; fruit 1′ long, contracted above. (N. rubrodiscum, *Morong.* N. luteum, *Man.;* not *Smith.*) — N. Vt. to Mich. and Penn. Probably a hybrid between this and the next species.

2. **N. Kalmiànum,** Ait. Very slender and with slender rootstock; submersed leaves thin, round-reniform, the floating broadly elliptical with a deep narrow sinus, 2 – 4′ long; sepals usually 5, the flowers an inch broad or less; petals spatulate or obovate; stigmas 7 – 10-rayed, dark red; fruit globular with a short neck (6 – 9″ in diameter). (N. luteum, var. pumilum, *Man.*) — Maine to Penn and Minn., and northward.

3. **N. sagittifòlium,** Pursh. Rootstock stout; leaves narrowly oblong to oblong-lanceolate with a short sinus, 6 – 15′ long; flowers small (1′ broad). — S. Ind. and Ill. (*Schneck*), and southward.

## ORDER 7. SARRACENIÀCEÆ. (PITCHER-PLANTS.)

*Polyandrous and hypogynous bog-plants, with hollow pitcher-form or trumpet-shaped leaves,* — comprising one plant in the mountains of Guiana, another (Darlingtonia, *Torr.*) in California, and the following genus in the Atlantic United States.

### 1. SARRACÈNIA, Tourn. SIDE-SADDLE FLOWER.

Sepals 5, with 3 bractlets at the base, colored, persistent. Petals 5, oblong or obovate, incurved, deciduous. Stamens numerous, hypogynous. Ovary compound, 5-celled, globose, crowned with a short style, which is expanded at the summit into a very broad and petal-like, 5-angled, 5-rayed, umbrella-shaped body, the 5 delicate rays terminating under the angles in as many little hooked stigmas. Capsule with a granular surface, 5-celled, with many-seeded placentæ in the axis, loculicidally 5-valved. Seeds anatropous, with a small embryo at the base of fleshy albumen. — Perennials, yellowish-green and purplish; the hollow leaves all radical, with a wing on one side, and a rounded arching hood at the apex. Scape naked, 1-flowered; flower nodding. (Named by Tournefort in honor of *Dr. Sarrasin* of Quebec, who first sent our Northern species, and a botanical account of it, to Europe.)

1. **S. purpùrea,** L. (SIDE-SADDLE FLOWER. PITCHER-PLANT. HUNTSMAN'S CUP.) *Leaves pitcher-shaped,* ascending, curved, broadly winged; the hood erect, open, round heart-shaped; *flower deep purple;* the fiddle-shaped petals arched over the greenish-yellow style. — Varies rarely with greenish-yellow flowers, and without purple veins in the foliage. — Peat-bogs; common from N Eng. to Minn., N. E. Iowa, and southward east of the Alleghanies. June. — The curious leaves are usually half filled with water and drowned insects. The inner face of the hood is clothed with stiff bristles pointing downward. Flower globose, nodding on a scape a foot high; it is difficult to fancy any resemblance between its shape and a side-saddle, but it is not very unlike a pillion.

2. **S. flàva,** L. (TRUMPETS.) *Leaves long* (1 – 3°) *and trumpet-shaped,* erect, with an open mouth, the erect hood rounded, narrow at the base; wing almost none; *flower yellow,* the petals becoming long and drooping. — Bogs, Va and southward. April.

## ORDER 8. PAPAVERÀCEÆ. (POPPY FAMILY.)

*Herbs with milky or colored juice, regular flowers with the parts in twos or fours, fugacious sepals, polyandrous, hypogynous, the ovary* 1-*celled with two or more parietal placentæ.* — Sepals 2, rarely 3, falling when the flower expands. Petals 4 – 12, spreading, imbricated and often crumpled in the bud, early deciduous. Stamens rarely as few as 16, distinct. Fruit a dry 1-celled pod (in the Poppy imperfectly many-celled, in Glaucium 2-celled). Seeds numerous, anatropous, often crested, with a minute embryo at the base of fleshy and oily albumen. — Leaves alternate, without stipules. Peduncles mostly 1-flowered. Juice narcotic or acrid.

* Petals 8 – 12, not crumpled in the bud, white. Pod 1-celled, 2-valved.

1. **Sanguinaria.** Petals white. Leaves and 1-flowered scape from a short rootstock.

* * Petals 4, crumpled in the bud. Pod 2-valved or more.

+ Pod 2 – 4-valved, the valves separating to the base from the placentas. Leaves pinnately parted. Flowers yellow.

2. **Stylophorum.** Pod bristly; style distinct; stigmas and placentas 3 – 4.
3. **Chelidonium.** Pod linear, smooth; style almost none; stigmas and placentas 2.
4. **Glaucium.** Pod rough, long-linear, 2-celled by a spongy partition; style none.

+ + Pod 4 – 20-valved, dehiscent only at the top or to the middle.

5. **Papaver.** Ovary incompletely many-celled; stigmas united into a radiate sessile crown.
6. **Argemone.** Stigmas (sessile) and placentas 4 – 6. Pod and leaves prickly.

## 1. SANGUINÀRIA, Dill. BLOOD-ROOT.

Sepals 2. Petals 8 – 12, spatulate-oblong, the inner narrower. Stamens about 24. Style short; stigma 2-grooved. Pod oblong, turgid, 1-celled, 2-valved. Seeds with a large crest. — A low perennial, with thick prostrate premorse rootstocks, surcharged with red-orange acrid juice, sending up in earliest spring a rounded palmate-lobed leaf, and a 1-flowered naked scape. Flower white, handsome, the bud erect, the petals not crumpled. (Name from the color of the juice.)

1. **S. Canadénsis,** L. — Open rich woods; common. April, May.

## 2. STYLÓPHORUM, Nutt. CELANDINE POPPY.

Sepals 2, hairy. Petals 4. Style distinct, columnar; stigma 2 – 4-lobed. Pods bristly, 2 – 4-valved to the base. Seeds conspicuously crested. — Perennial low herbs, with stems naked below and oppositely 2-leaved, or sometimes 1 – 3-leaved, and umbellately 1 – few-flowered at the summit; the flower-buds and the pods nodding. Leaves pinnately parted or divided. Juice yellow. (From στύλος, *style,* and φέρω, *to bear,* one of the distinctive characters.)

1. **S. diphýllum,** Nutt. Leaves pale or glaucous beneath, smoothish, deeply pinnatifid into 5 or 7 oblong sinuate-lobed divisions, and the root-leaves often with a pair of smaller and distinct leaflets; peduncles equalling the petioles; flower deep yellow (2′ broad); stigmas 3 or 4; pod oval. — Damp woods, W. Penn. to Wisc. and Tenn. May. — Foliage and flower resembling Celandine.

## 3. CHELIDÒNIUM, L. CELANDINE.

Sepals 2. Petals 4. Stamens 16 – 24. Style nearly none; stigma 2-lobed. Pod linear, slender, smooth, 2-valved, the valves opening from the bottom upward. Seeds crested. — Biennial herb with brittle stems, saffron-colored acrid juice, pinnately divided or 2-pinnatifid and toothed or cut leaves, and small yellow flowers in a pedunculate umbel; buds nodding. (Ancient Greek name from χελιδών, the *swallow,* because its flowers appear with the swallows.)

**C.** MÀJUS, L. (CELANDINE.) Waste grounds near dwellings. May – Aug. (Adv. from Eu.)

## 4. GLAÙCIUM, Tourn. HORN-POPPY.

Sepals 2. Petals 4. Style none; stigma 2-lobed or 2-horned. Pod very long and linear, completely 2-celled by a spongy false partition; seeds crestless. — Annuals or biennials, with saffron-colored juice, clasping leaves, and solitary yellow flowers. (The Greek name, γλαύκιον, from the glaucous foliage.)

**G.** LÙTEUM, Scop. Lower leaves pinnatifid; upper ones sinuate-lobed and toothed, cordate-clasping; pods rough (6 – 10′ long). — Waste places S. E. New Eng., Md., and Va.; not common. (Adv. from Eu.)

## 5. PAPÀVER, Tourn. Poppy.

Sepals mostly 2. Petals mostly 4. Stigmas united in a flat 4 – 20-rayed crown, resting on the summit of the ovary and capsule; the latter short and turgid, with 4 – 20 many-seeded placentæ projecting like imperfect partitions, opening by as many pores or chinks under the edge of the stigma. — Herbs with a white juice; the flower-buds nodding. (Derivation obscure.) — Three annual species of the Old World are sparingly adventive; viz.:

**P.** SOMNÍFERUM, L. (COMMON POPPY.) *Smooth*, glaucous; leaves clasping, wavy, incised and toothed; *pod globose;* corolla mostly white or purple. — Near dwellings in some places. (Adv. from Eu.)

**P.** DÙBIUM, L. (SMOOTH-FRUITED CORN-POPPY.) Pinnatifid leaves and the long stalks *bristly; pods club-shaped, smooth;* corolla light scarlet. — Cult. grounds, Westchester, Penn., and southward; rare. (Adv. from Eu.)

**P.** ARGEMÒNE, L. (ROUGH-FRUITED C.) Smaller, with finer-cut leaves and paler flowers than the last; *pods club-shaped and bristly.* — Waste grounds, near Philadelphia. (Adv. from Eu.)

## 6. ARGEMÒNE, L. Prickly Poppy.

Sepals 2 or 3, often prickly. Petals 4 – 6. Style almost none; stigmas 3 – 6, radiate. Pod oblong, prickly, opening by 3 – 6 valves at the top. Seeds crested. — Annuals or biennials, with prickly bristles and yellow juice. Leaves sessile, sinuate-lobed, and with prickly teeth, often blotched with white. Flower-buds erect, short-peduncled. (Name from ἄργεμα, a disease of the eye, for which the juice of a plant so called by the Greeks was a supposed remedy.)

1. **A. platýceras,** Link & Otto. Setose-hispid all over; petals white, 1½ – 2′ long; capsule armed with stout spines. — Central Kan. and Neb., south and westward.

A. MEXICÀNA, L. (MEXICAN P.) Flowers yellow, rarely white. — Waste places, southward. July – Oct. (Adv. from trop. Amer.)

## ORDER 9. FUMARIÀCEÆ. (FUMITORY FAMILY.)

*Delicate smooth herbs, with watery juice, compound dissected leaves, irregular flowers, with* 4 *somewhat united petals,* 6 *diadelphous stamens, and 2-merous pods and seeds like those of the* Poppy Family. — Sepals 2, small and scale-like. Corolla flattened, closed; the 4 petals in two pairs; the outer with spreading tips, and one or both of them spurred or saccate at the base; inner pair narrower, and their callous crested tips united over the stigma. Stamens in two sets of 3 each, placed opposite the larger petals, hypogynous; their filaments often united; middle anther of each set 2-celled, the lateral ones 1-celled. Pod 1-celled, either 1-seeded and indehiscent, or several-seeded with 2 parietal placentæ and deciduous valves. — Leaves delicate, usually alternate, without stipules. Slightly bitter, innocent plants.

* Corolla bigibbous or 2-spurred, the 2 outer petals alike. Pod several-seeded.

1 **Adlumia.** Petals united into a spongy persistent subcordate corolla. Seeds crestless.
2. **Dicentra.** Corolla cordate or 2-spurred at base, less united. Seeds crested.

* * Corolla with but one petal spurred at base, deciduous.

3. **Corydalis.** Pod with few to many crested or arilled seeds.
4 **Fumaria.** Fruit a globular 1-seeded nutlet. Seed crestless.

## 1. ADLÙMIA, Raf. CLIMBING FUMITORY.

Petals all permanently united in a cordate-ovate corolla, becoming spongy-cellular and persistent, enclosing the small, few-seeded pod. Seeds not crested. Stigma 2-crested. Filaments monadelphous below in a tube which is adherent to the corolla, diadelphous at the summit. — A climbing biennial, with thrice-pinnate leaves, cut-lobed delicate leaflets, and ample panicles of drooping white or purplish flowers. (Dedicated by Rafinesque to *Major Adlum.*)

1. **A. cirrhòsa,** Raf. — Wet woods; N. Eng. to Wisc., E. Kan., and southward. June–Oct. — A handsome vine, with delicate foliage, climbing by the slender young leaf-stalks over high bushes; often cultivated.

## 2. DICÉNTRA, Borkh. DUTCHMAN'S BREECHES.

Petals slightly cohering into a heart-shaped or 2-spurred corolla, either deciduous or withering-persistent. Stigma 2-crested and sometimes 2-horned. Filaments slightly united in two sets. Pod 10–20-seeded. Seeds crested. — Low, stemless perennials (as to our wild species) with ternately compound and dissected leaves, and racemose nodding flowers. Pedicels 2-bracted. (Name from δίς, *twice*, and κέντρον, *a spur;* — accidentally printed DICLÝTRA in the first instance, which by an erroneous conjecture was afterwards changed into DIÉLYTRA.)

* *Raceme simple, few-flowered.*

1. **D. Cucullària,** DC. (DUTCHMAN'S BREECHES.) Scape and slender-petioled leaves from a sort of *granulate bulb;* lobes of leaves linear; *corolla with 2 divergent spurs* longer than the pedicel; *crest of the inner petals minute.* — Rich woods, especially westward. — A very delicate plant, sending up in early spring, from the cluster of grain-like tubers crowded together in the form of a scaly bulb, the finely cut leaves and the slender scape, bearing 4–10 pretty, but odd, white flowers tipped with cream-color.

2. **D. Canadénsis,** DC. (SQUIRREL CORN.) Subterranean shoots bearing scattered *grain-like tubers* (resembling peas or grains of Indian corn, yellow); leaves as in n. 1; *corolla merely heart-shaped,* the spurs very short and rounded; *crest of the inner petals conspicuous, projecting.* — Rich woods, especially northward. April, May. — Flowers greenish-white tinged with rose, with the fragrance of Hyacinths.

* * *Racemes compound, clustered.*

3. **D. exímia,** DC. Subterranean shoots scaly; divisions and lobes of the leaves broadly oblong; corolla oblong, 2-saccate at the base; crest of the inner petals projecting. — Rocks, western N. Y., rare, and Alleghanies of Va. May–Aug — Coarser-leaved than the others; scapes 6–10′ high.

### 3. CORÝDALIS, Vent.

Corolla 1-spurred at the base (on the upper side), deciduous. Style persistent. Pod many-seeded. Seeds crested or arilled. Flowers in racemes. Our species are biennial, leafy-stemmed, and pale or glaucous. (The ancient Greek name for the crested lark.)

* *Stem strict; flowers purplish or rose-color with yellow tips.*

1. **C. glaùca,** Pursh. (Pale Corydalis.) Racemes panicled; spur of the corolla very short and rounded; pods erect, slender, elongated. — Rocky places; common; 6′ – 2° high. May – Aug.

* * *Low, ascending; flowers yellow.*

+ *Outer petals wing-crested on the back.*

2. **C. flávula,** DC. Pedicels slender, conspicuously bracted; corolla pale yellow, 3 – 4″ long, spur very short; tips of the outer petals pointed, longer than the inner; crest 3 – 4-toothed; pods torulose, pendulous or spreading; seeds acutely margined, rugose-reticulated; aril loose. — Penn. to Minn., and southward.

3. **C. micrántha,** Gray. Pedicels short and bracts small; corolla pale yellow, 4″ long, with short spur and entire crest, or flowers often cleistogamous and much smaller, without spur or crest, pods ascending, torulose; seeds obtuse-margined, smooth and shining. — N. Car., Ill., Minn., and southward.

4. **C. crystállina,** Engelm. Pedicels short, erect; corolla bright yellow, 8″ long, the spur nearly as long as the body; crest very broad, usually toothed; pods terete, erect, densely covered with transparent vesicles, seeds acutely margined, tuberculate. — S. W. Mo. and southward.

+ + *Outer petals merely carinate on the back, not crested.*

5. **C. aùrea,** Willd. (Golden C.) Corolla golden-yellow, ½′ long, the slightly decurved spur about half as long, shorter than the pedicel; pods spreading or pendulous, becoming torulose; seeds obtuse-margined. — Rocky banks, Vt. to Penn., Mo., Minn., and westward.

Var. **occidentàlis,** Engelm. Flowers rather larger, the spur nearly as long as the body; pods less torulose, on short pedicels; seeds acutish on the margin. — Neb. and Kan. to W. Tex. and westward.

### 4. FUMÀRIA, Tourn. Fumitory.

Corolla 1-spurred at the base. Style deciduous. Fruit indehiscent, small, globular, 1-seeded. Seeds crestless. — Branched and leafy-stemmed annuals, with finely dissected compound leaves, and small flowers in dense racemes or spikes. (Name from *fumus*, smoke.)

**F. officinàlis,** L. (Common Fumitory.) Sepals ovate-lanceolate, acute, sharply toothed, narrower and shorter than the corolla (which is flesh-color tipped with crimson); fruit slightly notched. — Waste places, about dwellings. (Adv. from Eu.)

## Order 10. CRUCÍFERÆ. (Mustard Family.)

*Herbs, with a pungent watery juice and cruciform tetradynamous flowers; fruit a silique or silicle.* — Sepals 4, deciduous. Petals 4, hypogynous, regular, placed opposite each other in pairs, their spreading limbs forming a cross. Stamens 6, two of them inserted lower down and shorter (rarely only 4 or 2). Pod usually 2-celled by a thin partition stretched between the two marginal placentæ, from which when ripe the valves separate, either much longer than broad (a *silique*), or short (a *silicle*), sometimes indehiscent and nut-like (*nucumentaceous*), or separating across into 1-seeded joints (*lomentaceous*). Seeds campylotropous, without albumen, filled by the large embryo, which is curved or folded in various ways: i. e. the *cotyledons accumbent*, viz., their margins on one side applied to the radicle, so that the cross-section of the seed appears thus o=; or else *incumbent*, viz., the back of one cotyledon applied to the radicle, thus o||. In these cases the cotyledons are plane; but they may be folded upon themselves and round the radicle, as in Mustard, where they are *conduplicate*, thus o>>. In Leavenworthia alone the whole embryo is straight. — Leaves alternate, no stipules. Flowers in terminal racemes or corymbs; pedicels rarely bracted. — A large and very natural family, of pungent or acrid, but not poisonous plants. (The characters of the genera are taken almost wholly from the pods and seeds; the flowers being nearly alike in all.)

### SERIES I. Pod 2-celled, regularly dehiscent by 2 valves.

* Pod compressed parallel to the broad partition. Seeds flat or flattish, orbicular or oval; cotyledons accumbent or nearly so.

+ Pod large, oblong-elliptical, valves nerveless. Seeds in 2 rows. Flowers yellow.

1. **Selenia.** Leaves pinnatisect. Raceme leafy-bracteate. Seeds winged.

+ + Pod linear; valves nerveless. Seeds in one row. Flowers yellow only in n. 2.

2. **Leavenworthia.** Seed winged; embryo straight or nearly so. Annual; stem often scapose, 1-few-flowered.
3. **Dentaria.** Stem naked below, 2-3-leaved. Pod coriaceous, with thick placentas, long-styled. Seeds wingless; cotyledons thick, very unequal.
4. **Cardamine.** Stem leafy. Pod coriaceous, with thick placentas. Seeds wingless; cotyledons flattened, equal.

+ + + Pod linear, or oblong, or orbicular; valves 1-nerved or nerveless. Seeds in 2 rows (except in species of n. 5).

5. **Arabis.** Pod long-linear, the flat or flattish valves more or less 1-nerved. Seeds winged or wingless. Flowers white to purple. Stems leafy, at least below.
6. **Draba.** Pod oval to narrowly oblong or lanceolate; valves flat or flattish, faintly nerved or veined. Seeds wingless, numerous.
7. **Alyssum.** Pod orbicular; valves veinless, somewhat convex with flattened margin. Seeds wingless, 2-4.

* * Pod terete or turgid, or 4-angled by the prominent midnerves. Seeds wingless, more or less turgid.

+ Pods short. (See also n. 11.)

8. **Lesquerella.** Pod globular-inflated, about 4-seeded; valves nerveless. Cotyledons accumbent. Flowers yellow.
9. **Camelina.** Pod obovoid, many-seeded, valves 1-nerved; style slender. Cotyledons incumbent. Flowers yellow.
10 **Subularia.** Pod ovoid or globular, few-seeded, valves 1-nerved; style none. Cotyledons long, folded transversely. Flowers white. Dwarf stemless aquatic.

+ + Pod linear (or oblong or even globular in n. 11).

++ Cotyledons accumbent.

11. **Nasturtium.** Pod often short; valves strongly convex, nerveless. Seeds small, in 2 rows in each cell. Flowers yellow or white.

12. **Barbarea.** Pod somewhat 4-sided; valves strongly 1-nerved. Seeds in 1 row. Flowers yellow.

++ ++ Cotyledons incumbent or partially so.

13. **Hesperis.** Pod terete, elongated; stigma-lobes narrow, erect. Flowers large, purple.

14. **Erysimum.** Pod 4-sided; valves strongly 1-nerved; stigma broadly 2-lobed. Pubescence of appressed 2–3-parted hairs. Flowers yellow.

15. **Sisymbrium.** Pod angled or teretish; valves 1–3-nerved; stigma small. Flowers yellow or white, small.

16. **Thelypodium.** Pod teretish; valves 1-nerved; stigma entire. Cotyledons obliquely incumbent. Flowers rose-color. Leaves auricled.

++ ++ ++ Cotyledons conduplicate.

17. **Brassica.** Pod beaked or pointed beyond the end of the valves, or tipped with a rigid style, nearly terete, or 4-sided. Flowers yellow or whitish.

* * Pod short; the boat-shaped valves conduplicate or much flattened contrary to the narrow partition. Flowers white.

18. **Capsella.** Pod many-seeded, obcordate-triangular, wingless. Cotyledons incumbent.

19. **Thlaspi.** Pod several-seeded, obovate or obcordate, winged. Cotyledons accumbent.

20. **Lepidium.** Pod 2-seeded, flat, scale-shaped. Cotyledons incumbent or accumbent.

21. **Senebiera.** Pod 2-seeded, didymous; the valves rugose, separating at maturity from the little partition as 2 closed 1-seeded nutlets. Cotyledons incumbent, narrow.

SERIES II. Pods indehiscent, continuous or transversely jointed; joints 1-celled.

22. **Cakile.** Pod short, 2-jointed; joints 1-seeded. Cotyledons plane, accumbent.

23. **Raphanus.** Pod elongated, several-seeded, continuous, or constricted between the seeds and moniliform. Cotyledons conduplicate.

## 1. SELÈNIA, Nutt.

Pod large, oblong-elliptical, flat; the valves nerveless. Seeds in 2 rows in each cell, rounded, broadly winged; cotyledons accumbent; radicle short. — A low annual, with once or twice pinnatifid leaves and leafy-bracteate racemes of yellow flowers. (Name from σελήνη, *the moon*, with allusion to Lunaria, which it somewhat resembles in its pods.)

1. **S. aùrea,** Nutt. Lobes of the simply pinnatifid leaves entire or toothed; pod ½′ long, on elongated spreading pedicels, beaked by the long slender style. — Mo. and Kan. to Tex.

## 2. LEAVENWÓRTHIA, Torr.

Pod broadly linear or oblong, flat; the valves nerveless, but minutely reticulate-veined. Seeds in a single row in each cell, flat, surrounded by a thick wing. Embryo straight! or the short radicle only slightly bent in the direction which if continued would make the orbicular cotyledons accumbent. — Little winter annuals, glabrous and often stemless, with lyrate leaves and short 1–few-flowered scape-like peduncles. (Named in honor of the late *M. C. Leavenworth.*)

1. **L. Michaùxii,** Torr. Scapes 2–6′ high; leaf-lobes usually numerous (7–15); petals purplish or nearly white with a yellowish base, obtuse;

pods not torulose, oblong to linear (6–15″ long); style short. — S. Ind. to Tenn. and Mo.

2. **L. torulòsa,** Gray. Similar, but pods torulose even when young, linear; style 1–2″ long; seeds acutely margined rather than winged; petals emarginate. — Barrens of Ky. and Tenn.

### 3. DENTÀRIA, Tourn. TOOTHWORT. PEPPER-ROOT.

Pod lanceolate, flat, as in Cardamine. Style elongated. Seeds in one row, wingless, the stalks broad and flat. Cotyledons petioled, thick and very unequal, their margins somewhat infolding each other. — Perennials, of damp woodlands, with long, horizontal, fleshy, sometimes interrupted, scaly or toothed rootstocks, of a pleasant pungent taste; the simple stems leafless below, bearing 2 or 3 petioled compound leaves about or above the middle, and terminated by a single corymb or short raceme of large white or purple flowers. Flowers larger, pods broader, and seeds larger than is usual in Cardamine. (Name from *dens*, a tooth.)

* *Rootstock elongated; leaves 3-foliolate.*

1. **D. diphýlla,** L. Rootstock long and continuous, often branched, toothed; stem-leaves 2, similar to the radical ones, close together; leaflets rhombic-ovate or oblong-ovate, shortly petiolate, coarsely crenate, the teeth abruptly acute; petals white. — Rich woods, Maine to Minn. and Ky. May. — Rootstocks 5–10′ long, crisp, tasting like Water-Cress.

* * *Rootstock tuberous, more or less moniliform; leaves 3-foliolate or 3-parted.*

2. **D. laciniàta,** Muhl. Tubers deep-seated, usually not jointed nor prominently tubercled; root-leaves often none; stem-leaves 3-parted, the lateral segments often 2-lobed, all broadly oblong to linear, more or less gash-toothed; flowers white or rose-color. — N. Eng. to Minn., Kan., and southward. April, May. — Var. MULTÍFIDA, a slender form with the narrowly linear segments usually more or less divided into linear lobes. (D. multifida, *Muhl.*) Southward, scarcely if at all within our limits.

3. **D. heterophýlla,** Nutt. Tubers near the surface, jointed, narrowly oblong or thick-clavate, prominently tubercled; leaves 3-foliolate, the leaflets distinctly petiolate, oblong-lanceolate to linear, entire to rather deeply crenate, rarely laciniate or lobed; root-leaves with ovate or lanceolate and usually lobed leaflets. — Penn. to Ky. and southward. Blooming a little later than the last.

4. **D. máxima,** Nutt. Tubers jointed, strongly tubercled; stem-leaves usually alternate, 3-foliolate; leaflets ovate or oblong-ovate, coarsely toothed and somewhat cleft or lobed. — Vt. to western N. Y. and Penn. May.

### 4. CARDAMÌNE, Tourn. BITTER CRESS.

Pod linear, flattened, usually opening elastically from the base; the valves nerveless and veinless, or nearly so; placentas and partition thick. Seeds in a single row in each cell, wingless; their stalks slender. Cotyledons accumbent, flattened, equal or nearly so, petiolate. — Mostly glabrous perennials, leafy-stemmed, growing along watercourses and in wet places. Flowers white or purple. (A Greek name, in Dioscorides, for some cress, from its cordial or cardiacal qualities.)

* *Root perennial; leaves simple.*

1. **C. rhomboídea,** DC. (SPRING CRESS.) *Stems upright from a tuberous base and slender rootstock bearing small tubers, simple;* root-leaves round and often heart-shaped; lower stem-leaves ovate or rhombic-oblong, somewhat petioled, the upper almost lanceolate, sessile, all often sparingly toothed; pods linear-lanceolate, pointed with a slender style tipped with a conspicuous stigma; *seeds round-oval.* — Wet meadows and springs; common. April–June. — Flowers large, white.

Var. **purpùrea,** Torr. Lower (4–6′ high), and usually slightly pubescent; flowers rose-purple, appearing earlier. — Along streams in rich soil. Western N. Y. to Md. and Wisc.

2. **C. rotundifòlia,** Michx. (MOUNTAIN WATER-CRESS.) *Stems branching, weak or decumbent, making long runners; root fibrous:* leaves all much alike, roundish, somewhat angled, often heart-shaped at the base, petioled; pods small, linear-awl-shaped, pointed with the slender style; stigma minute; *seeds oval-oblong.* — Cool shaded springs, N. J. (Middletown, *Willis*) to Ky., and southward along the mountains. May, June. — Flowers white, smaller than in n. 1.

3. **C. bellidifòlia,** L. *Dwarf* (2–3′ high), alpine, tufted; leaves ovate, entire, or sometimes with a blunt lateral tooth (4″ long), on long petioles; pods 1′ long, upright, linear; *style nearly none,* stout. — Summits of the White Mountains and Katahdin, Maine. July. — Flowers 1-5, white. (Eu.)

* * *Root perennial; leaves pinnate; flowers showy.*

4. **C. praténsis,** L. (CUCKOO FLOWER.) Stem ascending from a short rootstock, simple; leaflets 7–13, those of the lower leaves rounded and stalked, of the upper oblong or linear, entire, or slightly angled-toothed; petals (white or rose-color) thrice the length of the calyx; pod 9–15″ long, 1″ broad; style short. — Wet places and bogs, Vt. to N. J., Wisc., and northward; rare. May. (Eu.)

* * * *Root mostly biennial or annual; leaves pinnate; flowers small, white.*

5. **C. hirsùta,** L. (SMALL BITTER CRESS.) Glabrous or beset with scattered hairs; stems (3′–2° high) erect or ascending from the spreading cluster of root-leaves; their leaflets rounded, those of the upper leaves oblong or linear and often confluent, all either toothed, angled, or entire; pods linear, very narrow, erect or ascending; style variable. — Wet places; common. May–July. The ordinary form corresponds closely to the European var. SYLVÁTICA, Gaud. The typical imperfectly developed annual form, with only 4 stamens and rather strict pods, occurs very rarely. A form answering to C. parviflora of Europe, with mostly linear leaflets and pods often erect on spreading pedicels, is occasionally found in drier localities. (Eu., Asia.)

## 5. ÁRABIS, L. ROCK CRESS.

Pod linear, flattened; placentas not thickened; the valves plane or convex, more or less 1-nerved in the middle, or longitudinally veiny. Seeds usually margined or winged. Cotyledons accumbent or a little oblique. — Leaves seldom divided. Flowers white or purple. (Name from the country, *Arabia.* See *Linn. Phil. Bot.* § 235.)

§ 1. ARABIS proper. *Seeds in one row in each cell, orbicular or nearly so, more or less wing-margined; cotyledons strictly accumbent.*

* *Low, chiefly biennials, diffuse or spreading from the base.*

1. **A. Ludoviciàna,** Meyer. Nearly glabrous, often annual; leaves all pinnately parted into oblong or linear few-toothed or entire divisions, those of the lower leaves numerous; pedicels very short; flowers small, white; pods rather broadly linear, spreading, flat; seeds winged. — Open grounds, Va. to Mo., and southward.

* * *Erect and simple leafy-stemmed biennials, with simple leaves, white or whitish flowers, narrow but flattened ascending or erect pods, and nearly wingless seeds.*

2. **A. pàtens,** Sulliv. Downy with spreading hairs, erect (1–2° high); stem-leaves oblong-ovate, acutish, coarsely toothed or the uppermost entire, partly clasping by the heart-shaped base; petals (bright white, 4″ long) twice the length of the calyx; *pedicels slender, spreading; pods spreading or ascending, tipped with a distinct style.* — Penn. to central Ohio and southward; Minn. April, May.

3. **A. hirsùta,** Scop. Rough-hairy, sometimes smoothish, strictly erect (1–2° high); stem-leaves oblong or lanceolate, entire or toothed, partly clasping by a somewhat arrow-shaped or heart-shaped base; petals (greenish-white) small, but longer than the calyx; *pedicels and pods strictly upright; style scarcely any;* immature seeds somewhat 2-rowed. — Rocks, common, especially northward. May, June. (Eu.)

* * * *Erect and simple leafy-stemmed biennials* (1–3° *high*), *with small whitish flowers, recurved-spreading or pendulous flat pods* (3–4′ *long*), *and broadly winged seeds, their stalks adherent to the partition; root-leaves rarely lyrate.*

4. **A. lævigàta,** Poir. *Smooth* and glaucous, upright; *stem-leaves partly clasping* by the arrow-shaped base, lanceolate or linear, sparingly cut-toothed or entire; petals scarcely longer than the calyx; *pods long and narrow, recurved-spreading* on ascending or merely spreading pedicels. — Rocky places, Maine to Minn. and southward. May.

5. **A. Canadénsis,** L. (Sickle-pod.) Stem upright, smooth above; *stem-leaves pubescent, pointed at both ends,* oblong-lanceolate, sessile, the lower toothed; petals twice the length of the calyx, oblong-linear; *pods very flat, scythe-shaped, hanging* on rough-hairy pedicels (2″ wide). — Woods and ravines; not rare, especially westward. June–Aug.

§ 2. TURRÌTIS. *Seeds not so broad as the partition, in two more or less distinct rows in each cell, at least when young; strict and very leafy-stemmed biennials; cauline leaves partly clasping by a sagittate base.* (*Our species very glabrous, except the mostly hirsute base of the stem and the lower leaves.*)

6. **A. perfoliàta,** Lam. (Tower Mustard.) Tall (2–4° high), *glaucous;* stem-leaves oblong or ovate-lanceolate, entire; *petals yellowish-white, little longer than the calyx; pods very narrow* (3′ long) *and pedicels strictly erect;* seeds marginless; cotyledons often oblique. — Rocks and fields, N. Eng. to Minn. (rare), north and westward. (Eu.)

7. **A. confinis,** Watson. Scarcely glaucous, 1–3° high; pubescence below finely stellate; *stem-leaves lanceolate or oblong-linear*, entire (1–2′ long), with narrow auricles, or the lowest spatulate and toothed; *petals white or rose-color, fully twice the length of the calyx;* pedicels and flat *pods loosely erect, or ascending, or even spreading;* seeds wing-margined, when mature little narrower than the partition. (A. Drummondii, *Man.*) — From the lower St. Lawrence to Minn., south to Conn., N. Y., and Ill. — Pods 2½–3½′ long, or in a var. (T. brachycarpa, *Torr. & Gray*) only 1–2′ long.

§ 3. PSEUDÁRABIS. *Seeds oblong or elliptical, very small, wingless, in one row; cotyledons often more or less oblique. Biennial or perennial, branching from the base.*

8. **A. lyràta,** L. Mostly glabrous, except the *lyrate-pinnatifid root-leaves;* stem-leaves scattered, spatulate or linear with a tapering base, sparingly toothed or entire; *petals white*, much longer than the yellowish calyx; pods long and slender, flat, ascending or spreading. — On rocks or sandy shores, New Eng. to Ky. along the mountains, Minn., and northward. April–July. — Usually biennial, but southward in the mountains decidedly perennial.

9. **A. dentàta,** Torr. & Gray. Roughish-pubescent, slender (1–2° high); *leaves oblong*, very obtuse, unequally and sharply toothed; those of the stem *numerous, half-clasping and eared* at the base, of the root broader and tapering into a short petiole; petals (whitish) scarcely exceeding the calyx; *pods widely spreading, very slender, short-stalked; style scarcely any.* — N. Y. to Mich., Minn., and southward. May, June.

## 6. DRÀBA, Dill. Whitlow-Grass.

Pod oval, oblong, or even linear, flat; the valves plane or slightly convex; the partition broad. Seeds several or numerous, in 2 rows in each cell, marginless. Cotyledons accumbent. Filaments not toothed. — Low herbs with entire or toothed leaves, and white or yellow flowers; pubescence often stellate. (Name from δράβη, applied by Dioscorides to some cress; meaning unknown.)

§ 1. DRABÆA. *Petals not notched or cleft; perennial or biennial, leafy-stemmed, flowers white; pods twisted when ripe.*

1. **D. ramosíssima,** Desv. *Diffusely much branched* and forming many radical tufts, perennial (5–8′ high), pubescent; *leaves laciniate-toothed*, linear-lanceolate, the lower oblanceolate; racemes corymbosely-branched; *pods hairy*, oval-oblong or lanceolate (2–5″ long), on slender spreading pedicels, tipped with a *long style.* — Cliffs, Harper's Ferry, Natural Bridge, etc., Va., to Kentucky River, and southward. April, May.

2. **D. incàna,** L. *Hoary-pubescent*, biennial or somewhat perennial, the radical tuft seldom branching; leaves oblanceolate or the cauline lanceolate to ovate, few-toothed or entire; *pods oblong to lanceolate, usually acute and straight, often pubescent*, on short erect pedicels; style very short or none. — Dry rocks, Willoughby Mountain, Vt.; also northward and far westward. (Eu.)

Var. **arábisans,** Watson. Caudex much branched; pod glabrous, acuminate or acute, twisted, beaked with a longer distinct style. (D. arabisans, *Michx.*) — N. Vt. to western N. Y. and the shores of the upper lakes.

§ 2. DRABÉLLA. *Winter annuals; leafy stems short; flowers white (yellow in* n. 5)*; style none.* (*Leaves oblong or obovate, hairy, sessile.*)

3. **D. Caroliniàna,** Walt. Small (1–5′ high); leaves obovate, entire; peduncles scape-like; petals usually twice the length of the calyx; *raceme short or corymbose in fruit* (½–1′ long); *pods broadly linear, smooth,* much longer than the ascending pedicels. — Sandy and waste fields, E. Mass. to Minn., and southward. March–May. — Petals often wanting in the later racemes, especially in the var. MICRÁNTHA, Gray, with minutely rough-hairy pods, which is found with the other, westward.

4. **D. cuneifòlia,** Nutt. Leaves obovate, wedge-shaped, or the lowest spatulate, toothed; *raceme somewhat elongated in fruit* (1–3′), at length equalling the naked peduncle; petals emarginate, much longer than the calyx; *pods oblong-linear, minutely hairy, longer than the horizontal pedicels.* — Grassy places, Ill. to E. Kan., and southward. March, April.

5. **D. brachycárpa,** Nutt. Low (2-4′ high), minutely pubescent; *stems leafy* to the base of the dense at length elongated raceme; leaves narrowly oblong or the lowest ovate (2–4″ long), few toothed or entire; flowers small; *pods smooth, narrowly oblong, acutish* (2″ long), *about the length of the ascending or spreading pedicels.* — Dry hills, Ill., Ky., Va. (*A. H. Curtiss*), and southward. April. — Petals sometimes minute, sometimes none.

6. **D. nemoròsa,** L. Leaves oblong or somewhat lanceolate, more or less toothed; *racemes elongated* (4–8′ long in fruit); petals emarginate, small; *pods elliptical-oblong, half the length of the horizontal or widely-spreading pedicels,* pubescent or smooth. — Fort Gratiot, Mich., N. Minn., and westward. (Eu.)

§ 3. ERÓPHILA. *Petals 2-cleft.* (*Annual or biennial; flowers white.*)

**D.** VÉRNA, L. (WHITLOW-GRASS.) Small (scapes 1–3′ high); leaves all radical, oblong or lanceolate; racemes elongated in fruit; pods varying from round-oval to oblong-lanceolate, smooth, shorter than the pedicels. — Sandy waste places and roadsides. April, May. (Nat. from Eu.)

## 7. ALÝSSUM, Tourn.

Pod small, orbicular, with only one or two wingless seeds in a cell; valves nerveless, somewhat convex, the margin flattened. Flowers yellow or white. Filaments often toothed. Cotyledons accumbent. (Greek name of a plant reputed to check the hiccup, as the etymology denotes.)

**A.** MARÍTIMUM, L. (SWEET ALYSSUM), with green or slightly hoary linear leaves, honey-scented small white flowers, and 2-seeded pods, commonly cult., begins to be spontaneous southward. (Adv. from Eu.)

**A.** CALYCÌNUM, L., a dwarf hoary annual, with linear-spatulate leaves, pale yellow or whitish petals little exceeding the persistent calyx, and orbicular sharp margined 4-seeded pod, the style minute, occurs occasionally in grassland. (Adv. from Eu.)

## 8. LESQUERÉLLA, Watson.

Pod mostly globular or inflated, with a broad orbicular to ovate hyaline partition nerved to the middle, the hemispherical or convex thin valves nerveless. Seeds few or several, in 2 rows, flat. Cotyledons accumbent. Filaments toothless. — Low herbs, hoary with stellate hairs or lepidote. Flowers mostly yellow. (Named for *Leo Lesquereux.*)

1. **L. globòsa,** Watson. Minutely hoary all over; stems spreading or decumbent from an annual or biennial root; leaves oblong or lanceolate with a tapering base, repand-toothed or nearly entire; raceme at length elongated, with filiform diverging pedicels; petals light yellow; style filiform, much longer than the small globose, acutish, about 4-seeded pod; seeds marginless. (Vesicaria Shortii, *Torr.*) — Rocky banks, Ky. to Tenn. and Mo. May, June.

2. **L. grácilis,** Watson. Annual, slender; pubescence very fine; leaves narrowly oblanceolate; pods glabrous, suberect on ascending or curved pedicels, stipitate; style long. (Vesicaria gracilis, *Hook.*) — S. Kan. to Tex.

3. **L. Ludoviciàna,** Watson. Biennial or perennial; pubescence compact; leaves linear-oblanceolate, mostly entire; pods pubescent, pendulous on recurved pedicels; style long. (Vesicaria Ludoviciana, *DC.*) — Minn. to Neb. and southwestward.

### 9. CAMÉLINA, Crantz. FALSE FLAX.

Pod obovoid or pear-shaped, pointed, flattish parallel to the broad partition; valves 1-nerved. Seeds numerous, oblong. Cotyledons incumbent. Style slender. Flowers small, yellow. (Name from χαμαί, *dwarf*, and λίνον, *flax.*)

**C.** SATÌVA, Crantz. Annual; leaves lanceolate and arrow-shaped; pods margined, large. A weed in flax-fields, etc. (Adv. from Eu.)

### 10. SUBULÀRIA, L. AWLWORT.

Pod ovoid or globular, with a broad partition; the turgid valves 1-nerved. Seeds several. Cotyledons long and narrow, incumbently folded transversely, i. e., the cleft extending to the radicular side of the curvature. Style none. — A dwarf stemless perennial, aquatic; the tufted leaves awl-shaped (whence the name). Scape naked, few-flowered, 1 – 3′ high. Flowers minute, white.

1. **S. aquática,** L. Margin of lakes in Maine; Echo Lake, Franconia, N. H.; also in alpine regions of the western mountains. June, July. (Eu.)

### 11. NASTÚRTIUM, R. Br. WATER-CRESS.

Pod a short silique or a silicle, varying from oblong-linear to globular, terete or nearly so; valves strongly convex, nerveless. Seeds usually numerous, small, turgid, marginless, in 2 irregular rows in each cell (except in N. sylvestre). Cotyledons accumbent. — Aquatic or marsh plants, with yellow or white flowers, and commonly pinnate or pinnatifid leaves, usually glabrous. (Name from *Nasus tortus*, a convulsed nose, alluding to the effect of its pungent qualities.)

§ 1. *Petals white, twice the length of the calyx; pods linear; leaves pinnate.*

**N.** OFFICINÀLE, R. Br. (TRUE WATER-CRESS.) Perennial; stems spreading and rooting; leaflets 3 – 11, roundish or oblong, nearly entire; pods (6 – 8″ long) ascending on slender widely spreading pedicels. — Brooks and ditches; escaped from cultivation. (Nat. from Eu.)

§ 2. *Petals yellow or yellowish, seldom much exceeding the calyx; pods linear, oblong, or even ovoid or globular; leaves mostly pinnatifid.*

* *Perennial from creeping or subterranean shoots; flowers rather large, yellow.*

**N.** SYLVÉSTRE, R. Br. (YELLOW CRESS.) Stems ascending; *leaves pinnately parted*, the divisions toothed or cut, lanceolate or linear; pods (½′ long) on slender pedicels, linear and narrow, bringing the seeds into one row; *style very short.* — Wet meadows, Mass. to Va.; rare. (Nat. from Eu.)

1. **N. sinuàtum,** Nutt. Stems low, diffuse; *leaves pinnately cleft,* the short lobes nearly entire, linear-oblong; pods linear-oblong (4–6″ long), on slender pedicels; *style slender.* — Banks of the Mississippi and westward. June.

* * *Annual or biennial, rarely perennial (?), with simple fibrous roots; flowers small or minute, greenish or yellowish; leaves somewhat lyrate.*

2. **N. sessiliflòrum,** Nutt. Stems erect, rather simple; *leaves obtusely incised* or toothed, obovate or oblong; *flowers minute, nearly sessile;* pods elongated-oblong (5–6″ long), thick; style very short. — W. Ill. to E. Kan., Tenn., and southward. April–June.

3. **N. obtùsum,** Nutt. Stems much branched, diffusely spreading; *leaves pinnately parted or divided,* the divisions roundish and obtusely toothed or repand; *flowers minute, short-pedicelled; pods longer than the pedicels,* varying from linear-oblong to short-oval; style short. — With n. 1 and 2.

4. **N. palústre,** DC. (MARSH CRESS.) Stem erect; *leaves pinnately cleft or parted,* or the upper laciniate; the lobes oblong, cut-toothed; *pedicels about as long as the small flowers and mostly longer than* the oblong, ellipsoid, or ovoid *pods;* style short. — Wet places or in shallow water; common. June–Sept. — Flowers only 1–1½″ long. Stems 1–3° high. — The typical form with oblong pods is rare. Short pods and hirsute stems and leaves are common. Var. HÍSPIDUM is a form with ovoid or globular pods. (Eu.)

§ 3. *Petals white, much longer than the calyx; pods ovoid or globular; leaves undivided, or the lower ones pinnatifid; root perennial.*

5. **N. lacústre,** Gray. (LAKE CRESS.) Aquatic; immersed leaves 1–3-pinnately dissected into numerous capillary divisions; emersed leaves oblong, entire, serrate, or pinnatifid; pedicels widely spreading; *pods ovoid, 1-celled, a little longer than the style.* — Lakes and rivers, N. E. New York to N. J., Minn., and southwestward. July–Aug. — Near N. amphibium.

**N.** ARMORÀCIA, Fries. (HORSERADISH.) Root-leaves very large, oblong, crenate, rarely pinnatifid, those of the stem lanceolate; fruiting pedicels ascending; *pods globular* (seldom formed); *style very short.* (Cochlearia Armoracia, *L.*) — Roots large and long; a well-known condiment. Escaped from cultivation into moist ground. (Adv. from Eu.)

### 12. BARBARÈA, R. Br. WINTER CRESS.

Pod linear, terete or somewhat 4-sided, the valves being keeled by a midnerve. Seeds in a single row in each cell, marginless. Cotyledons accumbent. — Mostly biennials, resembling Nasturtium; flowers yellow. (Anciently called the Herb of St. Barbara.)

1. **B. vulgàris,** R. BR. (COMMON WINTER CRESS. YELLOW ROCKET.) Smooth; lower leaves lyrate, the terminal division round and usually large, the lateral 1–4 pairs or rarely wanting; upper leaves obovate, cut-toothed, or pinnatifid at the base; pods erect or slightly spreading; or in var. STRICTA, appressed; in var. ARCUÀTA, ascending on spreading pedicels. — Low grounds and roadsides; apparently introduced, but indigenous from L. Superior northward and westward. (Eu.)

**B. præcox**, R. Br. (Early Winter C.), with 5 – 8 pairs of lateral lobes to the leaves, and longer pods on very thick pedicels, — yet probably only a variety of the other, — somewhat cultivated from N. Y. southward as a winter salad, under the name of Scurvy-Grass, — is beginning to run wild. (Eu.)

## 13. HÉSPERIS, Tourn. Rocket.

Pod linear, nearly cylindrical; stigma lobed, erect. Seeds in 1 row in each cell, oblong, marginless. Cotyledons incumbent. — Biennial or perennial, with serrate sessile or petiolate leaves, and large purple flowers. (Name from ἑσπέρα, evening, from the evening fragrance of the flowers.)

**H. matronàlis**, L. (Dame's Violet.) Tall; leaves lanceolate, acuminate, mostly petiolate; pods 2 – 4′ long, spreading. — Sparingly naturalized. (Nat. from Eu.)

## 14. ERÝSIMUM, Tourn. Treacle Mustard.

Pod linear, 4-sided, the valves keeled with a strong midrib; stigma broadly lobed. Seeds in 1 row in each cell, oblong, marginless. Cotyledons (often obliquely) incumbent. — Chiefly biennials, with yellow flowers; the leaves not clasping. Pubescence of appressed 2 – 3-parted hairs. (Name from ἐρύω, *to draw blisters*.)

1. **E. ásperum**, DC. (Western Wall-flower.) Minutely roughish-hoary; stem simple, leaves lanceolate to linear, entire or somewhat toothed; *pods nearly erect* or widely spreading *on short pedicels, elongated* (3 – 4′ long), exactly 4-sided; stigma 2-lobed. — Ohio (on limestone cliffs) to Ill., Ark., Dak., and common westward. June, July. — Plant stout, 1 – 2° high; the crowded bright orange-yellow flowers as large as those of the Wall-flower. Petals orbicular, on very slender claws.

2. **E. cheiranthoìdes**, L. (Worm-seed Mustard.) Minutely roughish, branching, slender; leaves lanceolate, scarcely toothed; flowers small; *pods small and short* (7 – 12″ long), very obtusely angled, ascending on slender *divergent pedicels.* — Banks of streams, Mass. to Penn., Minn., and northward. July. (Eu.)

3. **E. parviflòrum**, Nutt. Stem erect, often simple; leaves linear-oblanceolate, entire or the lowest coarsely toothed; flowers small (3″ long); pods narrow, 1 – 2½′ long, ascending on short pedicels. — Minn. to Kan. and westward.

## 15. SISÝMBRIUM, Tourn. Hedge Mustard.

Pod terete, flattish or 4 – 6-sided, the valves 1 – 3-nerved; stigma small, entire. Seeds oblong, marginless, in 1 or 2 rows in each cell. Cotyledons incumbent. Calyx open. — Flowers small, white or yellow. Pubescence spreading. (An ancient Greek name for some plant of this family.) Ours are mostly annuals or biennials.

1. **S. hùmile**, Meyer. Perennial, branching from the base, sparingly pubescent, 6′ high or less; leaves narrowly oblanceolate, mostly coarsely and sharply toothed; flowers white or rose-color: pods very narrow, subterete, 4 – 9″ long, ascending on short pedicels, beaked with a short style, seeds 1-ranked. (Arabis petræa, *Man.*, not *Lam.*) — Willoughby Mountain, Vt.; Canada and westward. (N. Asia.)

2. **S. canéscens,** Nutt. (Tansy Mustard.) *Leaves 2-pinnatifid,* often hoary or downy, the divisions small and toothed; flowers yellowish, very small; pods in long racemes, oblong-club-shaped or oblong-linear, shorter than their mostly horizontal pedicels; *seeds 2-ranked* in each cell. — Penn. and N. Y. to Lake Superior, thence southward and westward. June – Aug.

**S.** Sóphia, L. A similar hoary species, with decompound leaves; pods slender, 6 – 15″ long, ascending; seeds 1-ranked. — Sparingly naturalized from Europe.

**S.** officinàle, Scop. (Hedge Mustard.) *Leaves runcinate;* flowers very small, pale yellow; *pods awl-shaped, close pressed* to the stem, scarcely stalked. — Waste places. May – Sept. — An unsightly branched weed, 2 – 3° high. (Nat. from Eu.)

**S.** Thaliàna, Gaud. (Mouse-ear Cress.) *Leaves obovate or oblong, entire* or barely toothed; flowers white; pods linear, somewhat 4-sided, longer than the slender spreading pedicels. — Old fields and rocks, Mass. to Kan. April, May. — A span high, slender, branched, hairy at the base. (Nat. from Eu.)

**S.** Alliària, Scop. Stout, erect; leaves reniform to ovate-cordate, coarsely repand-dentate; flowers white; pods tapering, 1 – 2′ long, ascending on very stout spreading pedicels. — Near Georgetown, D. C. (Nat from Eu.)

## 16. THELYPÒDIUM, Endl.

Pod terete or teretish; valves 1-nerved; stigma mostly entire. Seeds in 1 row in each cell, oblong, marginless. Cotyledons obliquely incumbent. — Stout biennials or perennials, with mostly large purplish or white flowers. Leaves or petioles often auricled at base. (Name from θῆλυς, *female,* and πούς, *foot,* the ovary in some species being stipitate.)

1. **T. pinnatífidum,** Watson. Glabrous (1 – 3° high), often branched above; root-leaves round or heart-shaped, on slender petioles; stem-leaves auricled, ovate-oblong and ovate-lanceolate (2 – 6′ long), sharply and often doubly toothed, tapering to each end, the lower into a winged petiole, rarely bearing a pair or two of small lateral lobes; flowers purplish; pods 1 – 1½′ long, on short diverging pedicels, pointed by a short style. (Arabis hesperidoides, *Gray.*) Alluvial river-banks, W. Pa. to Minn., Mo., and southwestward. May, June.

## 17. BRÁSSICA (Brassica and Sinàpis), Tourn.

Pod linear or oblong, nearly terete or 4-sided, with a stout 1-seeded beak or a rigid style; valves 1 – 5-nerved. Seeds globose, 1-rowed. Cotyledons incumbent, folded around the radicle. — Annuals or biennials, with yellow flowers. Lower leaves mostly lyrate, incised, or pinnatifid. (The Latin name of the Cabbage. Sinapis is the Greek σίναπι, which is said to come from the Celtic *nap,* a turnip.)

**B.** Sinapístrum, Boiss. (or Sinàpis arvénsis, L., the English Charlock), with knotty pods, fully one third occupied by a stout 2-edged beak (which is either empty or 1-seeded), the upper leaves barely toothed, is a noxious weed in grain-fields, from N. Eng. to Penn. and N. Y. westward. (Adv. from Eu.)

**B.** (or Sinàpis) álba. (White Mustard.) Pods bristly, ascending on spreading pedicels, more than half its length occupied by the sword-shaped 1-seeded beak; leaves all pinnatifid; seeds pale. (Cult. and adv. from Eu.)

**B.** (or Sinàpis) nìgra, Koch. (Black Mustard.) Pods smooth (½′ long), 4-cornered (the valves only 1-nerved), erect on appressed pedicels forming a slender raceme, tipped with a stout persistent style; seeds dark brown, smaller and more pungent than in the last; lower leaves with a large terminal lobe and a few small lateral ones. — Fields and waste places. (Adv. from Eu.)

B. CAMPÉSTRIS, L., in the form of the RUTABAGA and the TURNIP, sometimes persists a year or two in neglected grounds.

### 18. CAPSÉLLA, Medic. SHEPHERD'S PURSE.

Pod obcordate-triangular, flattened contrary to the narrow partition; the valves boat-shaped, wingless. Seeds numerous. Cotyledons incumbent. — Annuals; flowers small, white. (Name a diminutive of *capsa*, a box.)

**C.** BURSA-PASTÒRIS, Moench. Root-leaves clustered, pinnatifid or toothed; stem-leaves arrow-shaped, sessile. — Waste places; the commonest of weeds. April – Sept. (Nat. from Eu.)

### 19. THLÁSPI, Tourn. PENNYCRESS.

Pod orbicular, obovate, or obcordate, flattened contrary to the narrow partition, the midrib or keel of the boat-shaped valves extended into a wing. Seeds 2 – 8 in each cell. Cotyledons accumbent. Petals equal. — Low plants, with root-leaves undivided, stem-leaves arrow-shaped and clasping, and small white or purplish flowers. (Ancient Greek name, from *θλάω, to crush*, from the flattened pod.)

**T.** ARVÉNSE, L. (FIELD P. OR MITHRIDATE MUSTARD.) A smooth annual, with broadly winged pod $\frac{1}{2}'$ in diameter, several-seeded, deeply notched at top; style minute. — Waste places; rarely naturalized. (Nat. from Eu.)

### 20. LEPÍDIUM, Tourn. PEPPERWORT. PEPPERGRASS.

Pod roundish, much flattened contrary to the narrow partition; the valves boat-shaped and keeled. Seeds solitary in each cell, pendulous. Cotyledons incumbent, or in n. 1 accumbent! Flowers small, white or greenish. (Name from *λεπίδιον, a little scale*, alluding to the small flat pods.) — Ours are annuals or biennials, except the last.

* *Leaves all with a tapering base, the upper linear or lanceolate and entire, the lower and often the middle ones incised or pinnatifid; pods orbicular or oval, with a small notch at the top; the style minute or none; stamens only* 2.

1. **L. Virgínicum,** L. (WILD PEPPERGRASS.) *Cotyledons accumbent* and seed minutely margined; *pod marginless* or obscurely margined at the top; petals present, except in some of the later flowers. — June – Sept. A common roadside weed, which has immigrated from farther south.

2. **L. intermèdium,** Gray. *Cotyledons incumbent* as in the following; *pod minutely wing-margined at the top;* petals usually minute or wanting; otherwise nearly as in n. 1. — Dry places, from western N. Y. and N. Ill., north and westward.

**L.** RUDERÀLE, L. More diffuse, the smaller and oval *pods and the seeds marginless; petals always wanting.* — Roadsides, near Boston, Philadelphia, etc.; not common. (Adv. from Eu.)

* * *Stem-leaves with a sagittate partly clasping base, rather crowded.*

**L.** CAMPÉSTRE, Br. Minutely *soft downy;* leaves arrow-shaped, somewhat toothed; *pods ovate, winged*, rough, the style longer than the narrow notch. — Old fields, Mass. and N. Y. to Va.; rare. (Nat. from Eu.)

**L.** DRÀBA, L. Perennial, *obscurely hoary;* leaves oval or oblong, the upper with broad clasping auricles; flowers corymbose; *pods heart-shaped, wingless*, thickish, entire, tipped with a conspicuous style. — Astoria, near New York, *D. C. Eaton.* (Adv. from Eu.)

### 21. SENEBIÈRA, DC. Wart-Cress. Swine-Cress.

Pod flattened contrary to the narrow partition; the two cells indehiscent and falling away at maturity from the partition as closed nutlets, strongly wrinkled or tuberculate, 1-seeded. Cotyledons narrow and incumbently folded transversely. Low and diffuse or prostrate annuals or biennials, with minute whitish flowers. Stamens often only 2. (Dedicated to *J. Senebier*, a distinguished vegetable physiologist.)

**S.** Dídyma, Pers. Leaves 1 – 2-pinnately parted; *pods notched at the apex, rough-wrinkled.* — Waste places, at ports, E. Mass. to Va., etc.; an immigrant from farther south.

**S.** Coronòpus, DC. Leaves less divided, with narrower lobes; *pods not notched at the apex, tubercled.* — At ports, R. I. to Va., etc. (Adv. from Eu.)

### 22. CAKÌLE, Tourn. Sea-Rocket.

Pod short, 2-jointed across, fleshy, the upper joint separating at maturity; each indehiscent, 1-celled and 1-seeded, or the lower sometimes seedless. Seed erect in the upper, suspended in the lower joint. Cotyledons obliquely accumbent. — Seaside fleshy annuals. Flowers purplish. (An old Arabic name.)

1. **C. Americàna**, Nutt. (American Sea-Rocket.) Leaves obovate, sinuate and toothed; lower joint of the fruit obovoid, emarginate; the upper ovate, flattish at the apex. — Coast of the Northern States and of the Great Lakes. July – Sept. — Joints nearly even and fleshy when fresh; the upper one 4-angled and appearing more beaked when dry.

### 23. RÁPHANUS, Tourn. Radish.

Pods linear or oblong, tapering upward, indehiscent, several-seeded, continuous and spongy within between the seeds, or necklace-form by constriction between the seeds, with no proper partition. Style long. Seeds spherical and cotyledons conduplicate, as in Brassica. — Annuals or biennials. (The ancient Greek name from ῥᾳ, *quickly*, and φαίνω, *to appear*, alluding to the rapid germination.)

**R.** Raphanístrum, L. (Wild Radish. Jointed Charlock.) Pods necklace-form, long-beaked; leaves lyre-shaped, rough; petals yellow, turning whitish or purplish, veiny. — A troublesome weed in fields, E. New Eng. to Penn. (Adv. from Eu.)

## Order 11. CAPPARIDÀCEÆ. (Caper Family.)

*Herbs* (when in northern regions), *with cruciform flowers, but* 6 *or more not tetradynamous stamens, a* 1-*celled pod with* 2 *parietal placentæ, and kidney-shaped seeds.* — Pod as in Cruciferæ, but with no partition; seeds similar, but the embryo coiled rather than folded. Leaves alternate, mostly palmately compound. — Often with the acrid or pungent qualities of Cruciferæ (as in *capers*, the flower-buds of Cápparis spinòsa).

1. **Polanisia.** Stamens 8 or more Pod many-seeded, not or scarcely stipitate.
2. **Cleome.** Stamens 6. Pod linear, many-seeded, long-stipitate.
3. **Cleomella.** Stamens 6. Pod very short, rhomboidal, few-seeded, long-stipitate.

### 1. POLANÍSIA, Raf.

Petals with claws, notched at the apex. Stamens 8 – 32, unequal. Receptacle not elongated, bearing a gland behind the base of the ovary. Pod linear or oblong, veiny, turgid, many-seeded. — Fetid annuals, with glandular or clammy hairs. Flowers in leafy racemes. (Name from πολὺς, *many*, and ἄνισος, *unequal*, points in which the genus differs in its stamens from Cleome.)

1. **P. gravèolens,** Raf. Leaves with 3 oblong leaflets; stamens about 11, scarcely exceeding the petals; style short; pod slightly stipitate. — Gravelly shores, from Conn. and W. Vt. to Minn. and Kan. June – Aug. — Flowers small (2 – 3″ long); calyx and filaments purplish; petals yellowish-white.

2. **P. trachyspérma,** Torr. & Gray. Flowers larger (4 – 5″ long), the stamens (12 – 16) long-exserted; style 2 – 3″ long; pod sessile; seeds usually rough. — Iowa to Kan. and westward.

### 2. CLEÒME, L.

Petals entire, with claws. Stamens 6. Receptacle somewhat produced between the petals and stamens, and bearing a gland behind the stipitate ovary. Pod linear to oblong, many-seeded. — Our species a glabrous annual, with 3-foliolate leaves, leafy-bracteate racemes, and rose-colored or white flowers. (Name of uncertain derivation, early applied to some mustard-like plant.)

1. **C. integrifòlia,** Torr. & Gray. Calyx 4-cleft; petals with very short claws, leaflets narrowly lanceolate to oblong; bracts simple; pod oblong to linear, 1 – 2′ long, the stipe as long as the pedicel. — Minn. to Kan. and westward; N. Ill. Flowers showy; 2 – 3° high.

### 3. CLEOMÉLLA, DC.

Differing from Cleome in the clawless petals, glandless receptacle, and the short few-seeded pod with more or less distended or even conical valves. Flowers small, yellow. (Name a diminutive of *Cleome*.)

1. **C. angustifòlia,** Torr. Glabrous, 1 – 2° high; leaflets (3) and simple bracts linear to linear-lanceolate, acute; pod rhomboidal, the valves very bluntly conical; stipe shorter than the pedicel. — Kan. to Tex. and westward.

## Order 12. RESEDÀCEÆ. (Mignonette Family.)

*Herbs, with unsymmetrical* 4 – 7-*merous small flowers, a fleshy* 1-*sided hypogynous disk between the petals and the* (3 – 40) *stamens, bearing the latter. Calyx not closed in the bud. Capsule* 3 – 6-*lobed*, 3 – 6-*horned*, 1-*celled with* 3 – 6-*parietal placentæ, opening at the top before the seeds* (which are as in Order 11) *are full grown.* — Leaves alternate, with only glands for stipules. Flowers in terminal spikes or racemes. — A small and unimportant family, of the Old World, represented by the Mignonette (*Reseda odorata*) and the Dyer's Weed.

### 1. RESÈDA, Tourn. Mignonette. Dyer's Rocket.

Petals 4 – 7, cleft, unequal. Stamens 12 – 40, on one side of the flower. (Name from *resedo*, to calm, in allusion to supposed sedative properties.)

**R.** Lutèola, L. (Dyer's Weed or Weld.) Leaves lanceolate; calyx 4-parted; petals 4, greenish-yellow; the upper one 3 – 5-cleft, the two lateral 3-cleft, the lower one linear and entire; capsule depressed. — Roadsides, N. Y., etc. — Plant 2° high. Used for dyeing yellow. (Adv. from Eu.)

**R.** lùtea, L. Leaves irregularly pinnately parted or bipinnatifid; sepals and petals 6, stamens 15 – 20. — Nantucket, Mass., and ballast-grounds.

## ORDER 13. CISTÀCEÆ. (ROCK-ROSE FAMILY.)

*Low shrubs or herbs, with regular flowers, distinct and hypogynous mostly indefinite stamens, a persistent calyx, a 1-celled 3–5-valved capsule with as many parietal placentæ borne on the middle of the valves, and orthotropous albuminous seeds.* — Sepals 5; the two external much smaller, bract-like, or sometimes wanting; the three others a little twisted in the bud. Petals 3 or 5, convolute in the opposite direction from the calyx in the bud. Anthers short, innate, on slender filaments. Style single or none. Ovules few or many, on slender stalks, with the orifice at the apex. Embryo long and slender, straightish or curved, in mealy albumen; cotyledons narrow. — Leaves simple and mostly entire, the lower usually opposite, and the upper alternate. Inert plants.

1. **Helianthemum.** Petals 5, crumpled in the bud, fugacious (or none). Stigma nearly sessile. Stamens and ovules numerous in the petal-bearing flowers.
2. **Hudsonia.** Petals 5, fugacious. Stamens 9-30. Style long and slender. Pod strictly 1-celled, 2-6-seeded. Heath-like.
3. **Lechea.** Petals 3, persistent. Stamens 3-12. Style none. Pod partly 3-celled, the imperfect partitions bearing broad 2-seeded placentæ.

### 1. HELIÁNTHEMUM, Tourn. ROCK-ROSE.

Petals 5, crumpled in the bud, fugacious. Styles short or none in our species; stigma 3-lobed. Capsule strictly 1-celled. Embryo curved in the form of a hook or ring. — Flowers in most N. American species of two sorts, viz., *primary* or earlier ones, with large petals, indefinitely numerous stamens, and many-seeded pods; and *secondary*, or later ones, which are much smaller and in clusters, with small petals or none, 3–10 stamens, and much smaller 3–few-seeded pods. The yellow flowers open only once, in sunshine, and cast their petals by the next day. (Name from ἥλιος, *the sun*, and ἄνθεμον, *flower*.)

1. **H. Canadénse,** Michx. (FROST-WEED.) *Petal-bearing flowers solitary; the small secondary flowers clustered in the axils of the leaves,* nearly sessile; calyx of the large flowers hairy-pubescent, of the small ones hoary, like the stem and lower side of the lanceolate-oblong leaves. — Sandy or gravelly dry soil, Maine to Minn. and southward. June–Aug. — Stems at first simple. Corolla of the large flowers 1′ wide, producing pods 3″ long; pods of the smaller flowers not larger than a pin's head. A variety is more hoary, and with a stronger tendency to multiply the minute clustered flowers. Late in autumn crystals of ice shoot from the cracked bark at the root, whence the popular name.

2. **H. corymbòsum,** Michx. *Flowers all clustered at the summit* of the stem or branches, the petal-bearing ones at length on slender stalks; calyx woolly. — Pine barrens, N. J. and southward along the coast.

### 2. HUDSÒNIA, L.

Petals 5, fugacious (lasting but a day), much larger than the calyx. Stamens 9–30. Style long and slender; stigma minute. Pod oblong, enclosed in the calyx, strictly 1-celled, with 1 or 2 seeds attached near the base of each nerve-like placenta. Embryo coiled into the form of a closed hook. — Bushy heath-like little shrubs (seldom a foot high), covered all over with the small awl-shaped or scale-like alternate persistent downy leaves, producing numerous (small but showy) bright yellow flowers crowded along the upper part of the branches. (Named in honor of *Wm. Hudson*, an early English botanist.)

1. **H. ericoìdes,** L. Downy but greenish; leaves slender, awl-shaped, loose; flowers on slender naked stalks; ovary hairy. — Dry sandy soil near the coast, E. Maine to Va.; N. Conway, N. H. (*Miss Minns.*) May.

2. **H. tomentòsa,** Nutt. Hoary with down; leaves oval or narrowly oblong, 1″ long, close-pressed and imbricated; flowers sessile or some short-peduncled. — Sandy shores, Maine to Md., and along the Great Lakes to Minn.; rarely on banks of streams inland. May, June.

### 3. LÉCHEA, Kalm. Pinweed.

Petals 3, narrow, flat in the bud, not longer than the calyx, withering-persistent. Stamens 3–12. Style scarcely any; stigmas 3, plumose. Pod globular, partly 3-celled; the 3 broad and thin placentæ borne on imperfect partitions, each bearing 2 seeds on the face toward the valve; in our species the placentæ curve backward and partly enclose the seeds. Embryo straightish. — Homely perennial herbs, with very small greenish or purplish flowers, in summer. (Named in honor of *John Leche*, a Swedish botanist.)

∗ *Pubescence villous, spreading; leaves oblong; flowers very short-pedicelled in cymulose clusters.*

1. **L. màjor,** Michx. Stem upright (1–2° high), stout, simple, very leafy, producing slender prostrate branches from the base; leaves elliptical, mucronate-pointed, alternate and opposite or sometimes whorled; flowers densely crowded; pedicels shorter than the very small depressed-globose pod; sepals narrower than its valves. — Sterile grounds; common, especially southward.

∗ ∗ *Pubescence appressed, leaves narrower; flowers paniculate.*

+ *Leaves comparatively short, broad, and thin; panicles leafy.*

2. **L. thymifòlia,** Michx. Erect, about 2° high; stem-leaves oval or oblong (3–6″ long), commonly somewhat hairy, some whorled or opposite, those of the rather crowded panicles more linear; pod obovate-globose, one of the narrow outer sepals often longer. (L. Novæ-Cæsareæ, *Austin.*) — Dry grounds near the coast, E. Mass. to Fla.

+ + *Leaves firmer, narrow, the cauline linear to slender-subulate; panicles more naked and racemiform.*

++ *Fruiting calyx globular or broadly ovoid: pod rather large, nearly globose.*

3. **L. mìnor,** L. Rather strict, 1° high or more, usually glabrate in age; leaves of radical shoots lanceolate, rigid, 2–3″ long, the cauline linear, 6–9″ long; pod about 1″ high. — Dry and sterile ground; common.

Var. **marítima,** Gray in herb. Stouter and more rigid; leaves of radical shoots thicker, linear, hoary, the cauline puberulent or glabrous; calyx canescent. (L. thymifolia, *Pursh.;* L. maritima, *Leggett.*) — Sandy soil near the coast, Mass. to Ga.

4. **L. tenuifòlia,** Michx. Low, slender and diffuse, minutely pubescent or glabrous; leaves all small and very narrow; flowers mostly on very short

pedicels, diffusely racemose-paniculate; sepals without lateral ribs; pod ovoid-globose. — Dry, sterile soil, E. Mass. to Mo., and southward.

++ ++ *Smaller-flowered; fruiting calyx narrower; pod ellipsoidal.*

5. **L. racemulòsa,** Lam. Erect, soft-pubescent when young, soon nearly glabrous; leaves of radical shoots narrowly oblong, the cauline oblong-linear, 4–6″ long; inflorescence loose and diffuse; fruiting calyx glabrous. — Dry and rocky soil, Long Island to Ky., and southward.

## ORDER 14. VIOLÀCEÆ. (VIOLET FAMILY.)

*Herbs, with a somewhat irregular* 1-*spurred corolla of* 5 *petals,* 5 *hypogynous stamens with adnate introrse anthers conniving over the pistil, and a* 1-*celled* 3-*valved pod with* 3 *parietal placentæ.* — Sepals 5, persistent. Petals imbricated in the bud. Stamens with their short and broad filaments continued beyond the anther-cells, and often coherent with each other. Style usually club-shaped, with the simple stigma turned to one side. Valves of the capsule bearing the several-seeded placentæ on their middle; after opening, each valve as it dries folds together lengthwise firmly, projecting the seeds. Seeds anatropous, rather large, with a hard seed-coat, and a large and straight embryo nearly as long as the albumen; cotyledons flat. — Leaves alternate, with stipules. Flowers axillary, nodding. (Roots slightly acrid or emetic.)

1. **Viola.** Sepals auricled. Lower petal spurred. Stamens distinct, the 2 lower spurred.
2. **Solea.** Sepals not auricled. Petals equal in length. Stamens united into a sheath.
3. **Ionidium.** Sepals not auricled. Petals very unequal. Filaments distinct, the anthers merely connivent.

### 1. VÌOLA, Tourn. VIOLET. HEART'S-EASE.

Sepals extended into ears at the base. Petals somewhat unequal, the lower one spurred at the base. Stamens closely surrounding the ovary, often slightly cohering with each other; the two lower bearing spurs which project into the spur of the corolla. Besides these conspicuous blossoms, which appear in spring, others are produced later (especially in the stemless species), on shorter peduncles or on runners, usually concealed under the leaves; these never open nor develop petals, but are fertilized in the bud, and are far more fruitful than the ordinary blossoms. (The ancient Latin name of the genus.)

§ 1. *Perennials; stipules never leaf-like, the lower more or less scarious.*

* *Stemless, the leaves and scapes directly from a rootstock or from runners.*

+ *Stigma large, naked, not beaked; stolons none; rootstock short and thick.*

1. **V. pedàta,** L. (BIRD-FOOT V.) Nearly smooth; rootstock erect, not scaly; *leaves all* 3–5-*divided,* or the earliest only parted, the lateral divisions 2–3-parted, all linear or narrowly spatulate, sometimes 2–3-toothed or cut at the apex; flower large, 1′ broad, pale or deep lilac-purple or blue. — Sandy or gravelly soil, New Eng. to Minn., and southward. — Var. BÍCOLOR, Pursh, a very handsome variety, with the two upper petals deep violet, and as it were velvety, occurs sparingly from Mass. to Md.; most common in Md., on shale.

+ + *Stigma small, naked, often beaked or pointed.*

++ *Rootstock fleshy and thickened, never filiform nor producing runners; flowers violet or purple (rarely white); lateral petals bearded.*

2. **V. pedatífida,** G. Don. Leaves all palmately or pedately 5 – 7-parted; divisions 2 – 3-cleft; lobes linear; otherwise like n. 3. (V. delphinifolia, *Nutt.*) — Rich prairies, or more often in dry poor land, Ill. to Kan. and Minn.

3. **V. palmàta,** L. (Common Blue V.) Glabrous to villous-pubescent; early leaves roundish-cordate or reniform and merely crenate, the sides rolled inward when young, the later very various, palmately or pedately or hastately lobed or parted, the segments obovate to linear. (V. cucullata, var. palmata, *Gray*.) — Moist or dryish, especially sterile, ground; very common.

Var. **cucullàta,** Gray. Later leaves merely crenate, not lobed. (V. cucullata, *Ait.*) — Low grounds; common everywhere. Both forms are very variable in the size and shape of the leaves and sepals, and in the size and color of the flowers, which are deep or pale violet-blue or purple, sometimes white or variegated with white.

4. **V. sagittàta,** Ait. (Arrow-leaved V.) Smoothish or hairy; leaves on short and margined, or the later often on long and naked petioles, varying from oblong-heart-shaped to halberd-shaped, arrow-shaped, oblong-lanceolate or ovate, denticulate, sometimes cut-toothed near the base, the lateral or occasionally all the (rather large purple-blue) petals bearded; spur short and thick; stigma beaked. — Dry or moist sandy places, New Eng. to Minn., and southward. Some forms pass into the last.

++ ++ *Rootstocks long and filiform, extensively creeping.*

= *Flowers blue or purple.*

5. **V. Selkírkii,** Pursh. (Great-spurred V.) Small and delicate; the filiform rootstock fibrose-rooted, no runners above ground; smooth, except the round-heart-shaped crenate leaves, which are minutely hairy on the upper surface and have a deep narrowed sinus; *spur very large*, thickened at the end, almost as long as the beardless pale violet petals. — Damp and shady soil, N. Maine to W. Mass., central N. Y., L. Superior (*Robbins*), and northward; rare. — Scapes and petioles 1 – 2′, the leaf $\frac{1}{2}$ – $1\frac{1}{4}$′ long, thin; the spur 3″ long. (Eu.)

6. **V. palústris,** L. (Marsh V.) Smooth; leaves round-heart-shaped and kidney-form, slightly crenate; flowers (small) pale lilac with purple streaks, nearly beardless; *spur very short* and obtuse. — Alpine summits of the White Mountains, N. H., and high northward. June. (Eu.)

V. odoràta, L. (Sweet Violet), cultivated in gardens, from Europe, belongs near this group, and is sparingly spontaneous in some places.

= = *Flowers white (small, short-spurred), mostly with brown-purple veins; lateral petals bearded or beardless. Species apparently confluent.*

7. **V. blánda,** Willd. (Sweet White V.) Commonly glabrous; leaves round-heart-shaped or kidney-form; petals mostly beardless, the lower strongly veined. — Damp places, everywhere. Flowers faintly sweet-scented.

Var. **palustrifórmis,** Gray. The larger form; upper surface of the leaves sparsely and finely hairy; petals 5″ long, oftener bearded, less distinctly veined. — Shaded mossy ground, N. Eng. to Del., and westward.

Var. **renifòlia,** Gray. Slightly or strongly pubescent with soft spreading hairs; leaves round-reniform; petals usually beardless. (V. renifolia, *Gray.*) — Maine to Mass., western N. Y., Lake Superior, etc.

8. **V. primulæfòlia,** L. (PRIMROSE-LEAVED V.) Smooth or a little pubescent; leaves oblong or ovate, abrupt or somewhat heart-shaped at the base; petals often acute, the lateral ones usually sparingly bearded. — Damp or dry soil, N. Eng. to Fla., toward the coast.

9. **V. lanceolàta,** L. (LANCE-LEAVED VIOLET.) Smooth; leaves lanceolate, erect, blunt, tapering into a long-margined petiole, almost entire; petals beardless. — Damp soil; common, especially eastward.

= = = *Flowers yellow.*

10. **V. rotundifòlia,** Michx. (ROUND-LEAVED VIOLET.) Leaves round-ovate, heart-shaped, slightly crenate; lateral petals bearded and marked with brown lines; spur very short. — Cold woods, Maine to Minn., and south along the Alleghanies. —Smoothish; leaves 1′ broad at flowering, increasing to 3 or 4′ in the summer, then lying flat on the ground, shining above.

* * *Leafy-stemmed; all perennial with short rootstocks.*

+ *Low, at first nearly stemless; flowers yellow; stigma concave, bearded.*

11. **V. Nuttàllii,** Pursh. Pubescent or nearly glabrous; leaves ovate to oblong-lanceolate, obtuse, entire or slightly crenate, decurrent on the petiole. — Central Kansas and westward.

+ + *Stems erect, without root-leaves; stipules entire; spur very short; stigma beakless, pubescent.*

++ *Stems naked below; flowers yellow.*

12. **V. pubéscens,** Ait. (DOWNY YELLOW V.) Softly pubescent (6–12′ high); *leaves very broadly heart-shaped,* toothed, somewhat pointed; stipules ovate or ovate-lanceolate, large; lower petals veined with purple, capsule oblong to globular, glabrous or tomentose. — Woods, common. — Var. SCABRIÚSCULA, Torr. & Gray, smaller and greener, slightly pubescent (4–10′ high). — R. I. to Ky., and southwestward.

13. **V. hastàta,** Michx. (HALBERD-LEAVED V.) Nearly glabrous, slender (4–10′ high); *stem-leaves halberd-shaped* or oblong-heart-shaped, slightly serrate, acute; stipules ovate, small. — Woods, N. Ohio (near Painesville, *Miss Shattuck*), mountains of Penn., and southward; rare.

++ ++ *Stems more leafy and prolonged; flowers white or purplish*

14. **V. Canadénsis,** L. (CANADA V.) Upright (1–2° high); leaves heart-shaped, pointed, serrate; stipules ovate-lanceolate, entire; petals white or whitish inside, the upper ones mostly tinged with violet beneath, the lateral bearded. — Rich woods; common northward and along the Alleghanies. May–Aug.

+ + + *Stems erect or spreading (at first nearly acaulescent); stipules fringe-toothed; spur oblong to cylindrical; stigma naked.*

15. **V. striàta,** Ait. (PALE V.) Stems angular, ascending (6–10′ high); leaves heart-shaped, finely serrate, often acute; stipules oblong-lanceolate, large; *spur thickish, much shorter than the cream-colored or white petals,* the

lateral ones bearded, the lower striped with purplish lines; stigma beaked. — Low grounds, W. New Eng. to Minn. and Mo., and southward in the mountains. April – Oct.

16. **V. rostràta,** Pursh. (Long-spurred V.) Stems ascending (3 – 6′ high); leaves roundish-heart-shaped, serrate, the upper acute; stipules lanceolate, large; *spur slender* (½′ long), *longer than the pale violet beardless petals;* style straight and slender; stigma terminal, beakless. — Shaded hillsides, N. New Eng. to Mich., and southward in the Alleghanies; rather rare. June, July.

17. **V. canìna,** L., var. **Muhlenbérgii,** Gray. (Dog V.) Low (3 – 8′ high), mostly glabrous; stems ascending, mostly simple, from the base at length producing creeping branches; leaves heart-shaped, or the lowest kidney-form, crenate, the uppermost slightly pointed; stipules lanceolate; *spur cylindrical, half the length of the light violet petals,* the lateral ones slightly bearded; stigma beaked. — Damp or wet shady places; common. May – July. (Eu.) — Var. pubérula, Watson in herb. Finely puberulent; leaves mostly ovate and acutish with a cordate base, often small; flowers small and mostly cleistogamous. — Sandy or stony shores and islands of Lakes Huron and Superior. (*Robbins, Engelmann, etc.*) — Var. multicaùlis, Gray. Depressed and stoloniferous; flowers mostly cleistogamous; leaves small, suborbicular to reniform. — Ky. to Fla. and Tex.

§ 2. *Leaf-bearing throughout from an annual, biennial, or sometimes short-lived perennial root; the stipules large, leaf-like and lyrate-pinnatifid.*

**V.** trícolor, L. (Pansy. Heart's-ease.) Stem angled and branched; leaves roundish, or the upper oval and the lowest heart-shaped, crenate or entire; petals variable in color or variegated (yellow, whitish, violet-blue and purple); — in var. arvénsis shorter or little longer than the calyx. — Dry or sandy soil, N. Y. to Iowa, Kan., and southward; the variety sometimes seeming like a native plant. April – Sept. (Nat. from Eu.)

### 2. SÒLEA, Spreng., in part. Green Violet.

Sepals not prolonged at the base. Petals nearly equal in length, but the lower one larger and gibbous or saccate at the base, more notched than the others at the apex. Stamens completely united into a sheath enclosing the ovary, and bearing a broad gland on the lower side. Style hooked at the summit. — A homely perennial herb, with stems leafy to the top, and 1 – 3 small greenish-white flowers in the axils, on short recurved pedicels. (Named in honor of *W. Sole,* author of an essay on the British Mints.)

1. **S. cóncolor,** Ging. Plant 1 – 2° high; leaves oblong, pointed at both ends, entire; pod 1′ long. — Woods, N. Y. to Kan., and southward. June.

### 3. IONÍDIUM, Vent.

Sepals not prolonged at base. Petals very unequal, the two upper shorter, the lower longest and largest, concave at base, contracted in the middle. Filaments distinct, the two lower with a scale-like gland or spur at base; anthers merely connivent. — Perennials, branching and leafy, with alternate and opposite leaves, and small axillary flowers. (Name from **ἴον**, *violet,* and **εἶδος**, *appearance.*)

1. **I. polygalæfòlium,** Vent. Stems low, from a woody base; leaves linear to oblanceolate, or the lower obovate, entire, the stipules leaf-like or small or none; flowers solitary, nodding, 2″ long, white. (I. lineare, *Torr.*) — Kan. and southwestward.

## ORDER 15. CARYOPHYLLÀCEÆ. (PINK FAMILY.)

*Herbs, with opposite entire leaves, symmetrical* 4–5-*merous flowers, with or without petals; the distinct stamens no more than twice the number of the sepals, either hypogynous or perigynous; styles* 2–5 (*or rarely united into one*); *seeds several or usually many, attached to the base or to the central column of the* 1-*celled* (*rarely* 3–5-*celled*) *pod, with a slender embryo coiled or curved around the outside of mealy albumen,* in Dianthus nearly straight. — Bland herbs; the stems usually swollen at the joints; uppermost leaves rarely alternate. Leaves often united at the base. Calyx persistent. Styles stigmatic along the inside. Seeds amphitropous or campylotropous.

**Tribe I. SILENEÆ.** Sepals united into a tube or cup. Petals (mostly convolute in the bud) and stamens (10) borne on the stipe or stalk of the ovary, the former with slender claws, to the base of which the corresponding filaments often adhere, included in the calyx-tube. Seeds numerous. — Stipules none. Flowers often large and showy.

* Calyx with scaly bractlets or small leaves at the base. Seeds flattened on the back, attached by their face; embryo nearly straight.

1. **Dianthus.** Calyx terete, mostly cylindrical. Styles 2.

* * Calyx naked. Seeds globular or kidney-shaped; embryo curved or coiled.

2. **Gypsophila.** Calyx top-shaped or campanulate. Pod deeply 4-valved Styles 2.
3. **Saponaria.** Calyx oblong-cylindrical, obscurely nerved, terete or 5-angled. Pod shortly 4-valved. Styles 2.
4. **Silene.** Calyx 5-toothed, 10-nerved. Styles 3.
5. **Lychnis.** Calyx 5-toothed, 10-nerved. Styles 5, rarely 4.

**Tribe II. ALSINEÆ.** Sepals distinct or nearly so, imbricated in the bud. Petals when present without claws, mostly imbricated, and with the stamens inserted at the base of the sessile ovary, or into a little disk. Pod splitting into valves or teeth, several–many-seeded. Stamens opposite the sepals, when not more in number. — Low herbs.

* Stipules none.

+ Styles opposite the sepals, or, when fewer, opposite those which are exterior in the bud.

++ Pod short, splitting into as many valves as styles; valves often bifid or 2-parted.

6. **Arenaria.** Petals entire. Styles usually 3. Valves of the pod entire, bifid, or 2-parted.
7. **Stellaria.** Petals 2-cleft or none. Styles usually 3. Valves bifid or 2-parted.

++ Pod cylindrical, dehiscent by twice as many equal teeth as styles.

8. **Holosteum.** Petals denticulate or notched. Styles usually 3. Seeds fixed by the face.
9. **Cerastium.** Petals notched or 2-cleft. Styles 5 or 4. Seeds fixed edgewise.

+ + Styles alternate with the sepals. Stamens as many, or twice as many.

10. **Sagina.** Petals 4 or 5, entire, or none. Styles 4 or 5. Pod short, 4-5-valved.

* * Stipules present. Pod short.

11. **Buda.** Styles 3. Pod 3-valved. Leaves opposite.
12. **Spergula.** Styles 5. Valves of the pod opposite the sepals. Leaves whorled.

### 1. DIÁNTHUS, L. Pink. Carnation.

Calyx cylindrical, nerved or striate, 5-toothed, subtended by 2 or more imbricated bractlets. Stamens 10. Styles 2. Pod 1-celled, 4-valved at the apex. Seeds flattish on the back; embryo scarcely curved. — Ornamental plants, of well-known aspect and value in cultivation. (Name from Διός, *of Jupiter*, and ἄνθος, *flower*, i. e., Jove's own flower.)

**D. Armèria**, L. (Deptford Pink.) Annual; flowers clustered; bractlets of the calyx and *bracts lance-awl-form*, herbaceous, downy, as long as the tube; leaves linear, *hairy;* petals small, rose-color with white dots, crenate. — Fields, etc., eastward. July. (Adv. from Eu.)

**D. pròlifer**, L. Annual, *smooth*, slender; flowers clustered; *bractlets ovate, dry*, concealing the calyx; leaves few, narrow, linear, erect; petals small, pink. — N. J. and E. Penn. (Adv. from Eu.)

**D. deltoìdes**, L. (Maiden Pink.) Perennial; leaves short, narrowly lanceolate, downy and roughish; flowers solitary; bracts ovate, half as long as the tube; petals rose-color or white, toothed. — Mich., *L. H. Bailey.* (Nat. from Eu.)

**D. barbàtus**, L. (Sweet William.) Perennial; flowers fascicled; leaves large, lanceolate; bracts filiform-attenuate, equalling the calyx. — Sparingly spontaneous. (Adv. from Eu.)

### 2. GYPSÓPHILA, L.

Calyx narrowly top-shaped or campanulate, 5-nerved, 5-toothed, naked at base. Petals not crowned. Stamens 10. Styles 2. Pod 1-celled, 4-valved at the apex, sessile. — Slender glaucous annuals or perennials, with numerous small flowers. (Name from γύψος, *gypsum*, and φιλεῖν, *to love*.)

**G. muràlis**, L. Annual, much branched; leaves very narrowly linear; flowers on slender pedicels, solitary in the forks; calyx turbinate, the teeth short, obtuse; petals purplish, crenate or emarginate. — Sparingly naturalized. (Nat. from Eu.)

### 3. SAPONÀRIA, L.

Calyx narrowly ovoid or oblong, 5-toothed, obscurely nerved, naked. Stamens 10. Styles 2. Pod 1-celled, or incompletely 2 – 4-celled at base, 4-toothed at the apex. — Coarse annuals or perennial, with large flowers. (Name from *sapo*, soap, the mucilaginous juice forming a lather with water.)

**S. officinàlis**, L. (Soapwort. Bouncing Bet.) Flowers in corymbed clusters; calyx terete; petals crowned with an appendage at the top of the claw; leaves oval-lanceolate. — Roadsides, etc. July – Sept. — A stout perennial, with large rose-colored flowers, commonly double. (Adv. from Eu.)

**S. Vaccària**, L. Annual, glabrous; flowers in corymbed cymes; calyx 5-angled, enlarged and wing-angled in fruit; petals pale red, not crowned; leaves ovate-lanceolate. (Vaccaria vulgaris, *Host.*) — Occasionally spontaneous. (Adv. from Eu.)

### 4. SILÈNE, L. Catchfly. Campion.

Calyx 5-toothed, 10 – many-nerved, naked at the base. Stamens 10. Styles 3, rarely 4. Pod 1-celled, sometimes 3-celled at least at the base, opening by 3 or 6 teeth at the apex. — Flowers solitary or in cymes. Petals mostly crowned with a scale at the base of the blade. (Name from σίαλον, *saliva*, from the viscid exudation on the stems and calyx of many species. The English name *Catchfly* alludes to the same peculiarity.)

* *Dwarf, alpine, tufted, smooth, perennial; flowering shoots 1-flowered.*

1. **S. acaùlis**, L. (Moss Campion.) Tufted like a moss (1 – 2′ high); leaves linear, crowded; flowers almost sessile, or rarely on a naked peduncle;

petals purple or rarely white, notched or entire, crowned. — Alpine summits of the White Mountains, N. H. July. (Eu.)

* * *Calyx bladdery-inflated; perennial; flowers panicled, white, in summer.*

2. **S. stellàta,** Ait. (Starry Campion.) *Leaves in whorls of* 4, *ovate-lanceolate*, taper-pointed; calyx bell shaped; *petals cut into a fringe, crownless.* — Wooded banks, R. I. to Minn., and southward. — Stem 3° high, with a large and open pyramidal panicle. Corolla ¾′ broad.

3. **S. nívea,** Otth. *Leaves opposite, lanceolate or oblong,* taper-pointed; calyx oblong; *petals wedge-form, 2-cleft, minutely crowned.* — Penn. to Iowa and Minn.; rare. — Stem 1–2° high, almost smooth. Flowers few, larger than in the last.

**S.** Cucùbalus, Wibel. (Bladder Campion.) *Glaucous; leaves opposite, ovate-lanceolate; calyx globular, much inflated,* elegantly veined; petals 2-cleft, nearly crownless. (S. inflata, *Smith.*) — Fields and roadsides, E. New Eng. to Ill. — A foot high. Flowers loosely cymose. (Nat. from Eu.)

* * * *Calyx elongated or club-shaped, not inflated except by the enlarging pod; flowers cymose or clustered; perennial, pubescent with viscid hairs, especially the calyx; petals crowned, red or rose-color.*

4. **S. Pennsylvánica,** Michx. (Wild Pink.) Stems low (4–8′); root-leaves narrowly spatulate, nearly glabrous, tapering into hairy petioles; *stem-leaves* (2 or 3 pairs) *lanceolate; flowers clustered,* short-stalked; calyx club-shaped; *petals wedge-form, slightly notched and eroded, pink.* — Gravelly places, E. New Eng. to N. Y., Ky., and southward. April–June.

5. **S. Virgínica,** L. (Fire Pink. Catchfly.) Stems slender (1–2° high); *leaves thin, spatulate, or the upper oblong-lanceolate; flowers few and loosely cymose,* peduncled; calyx oblong-cylindrical, soon obconical; *petals oblong, 2-cleft, deep crimson;* the limb 1′ long. — Open woods, western N. Y. to Minn., and southward. June–Aug.

6. **S. règia,** Sims. (Royal Catchfly.) Stem roughish, erect (3–4° high); *leaves thickish, ovate-lanceolate,* acute; *flowers numerous, short-stalked,* in clusters, forming a strict panicle; calyx ovoid-club-shaped in fruit; *petals spatulate-lanceolate, mostly undivided, deep scarlet.* — Prairies, Ohio to Mo., and southward. July.

7. **S. rotundifòlia,** Nutt. (Round-leaved Catchfly.) Viscid-hairy; stems weak, branched, decumbent (2° long); *leaves thin, round, abruptly pointed,* the lower obovate; flowers few, loosely cymose, stalked; calyx elongated; *petals 2-cleft and cut-toothed, deep scarlet.* — Shaded banks of the Ohio, and in Ky. June–Aug. — Leaves and flowers large.

* * * * *Calyx not inflated, except by the enlarging pod; annuals.*

+ *Glabrous, a portion of each joint of the stem glutinous; flowers pink.*

8. **S. antirrhìna,** L. (Sleepy C.) Stem slender (8–30′ high); *leaves lanceolate or linear;* flowers small, paniculate; *calyx ovoid;* petals obcordate, crowned, opening transiently in sunshine. — Dry soil; common in waste places. June–Sept.

**S.** Armèria, L. (Sweet-William Catchfly.) Glaucous; *leaves ovate-lanceolate;* flowers in flat cymes, open in sunshine; *calyx club-shaped;* petals notched, crowned with awl-shaped scales. — Escaped from gardens; rare. (Adv. from Eu.)

++ *Viscid-pubescent: flowers white or nearly so, opening at night, sweet-scented.*

**S. noctúrna**, L. (Night C.) Leaves short, the lower spatulate, the upper linear; *flowers small, alternate in a 1-sided spike;* petals 2-parted. — Introduced sparingly in Pa., according to *Schweinitz.* (Adv. from Eu.)

**S. noctiflòra**, L. (Night-flowering C.) *Viscid-hairy*, tall (1 – 3° high); lower leaves large and spatulate, the upper lanceolate; *flowers few, peduncled;* calyx-tube elongated (over 1′ long), soon ovoid, with awl-shaped teeth; petals rather large, 2-parted, crowned. — Cultivated grounds.

## 5. LÝCHNIS, Tourn. Cockle.

Styles 5, rarely 4, and pod opening by as many or twice as many teeth; otherwise nearly as in Silene. Calyx in one species with leaf-like lobes. (Ancient Greek name for a scarlet or flame-colored species, from λύχνος, *a light* or *lamp*.)

**L. vespertìna**, Sibth. (Evening L.) Biennial, usually diœcious, *viscid-pubescent*, in foliage, etc., like Silene noctiflora; but 5 styles, calyx much shorter (7 – 9″ long), with lance-linear teeth, and *flowers white* or pinkish, opening at evening. — Cult. or waste grounds; scarce. (Adv. from Eu.)

**L. diúrna**, Sibth. (Red Lychnis.) Resembling L. vespertina, but less viscid, the calyx usually shorter (4 – 6″ long), and the flowers red, opening in the morning. — Rarely spontaneous. (Adv. from Eu.)

**L. Githàgo**, Lam. (Corn Cockle.) Annual, clothed with long soft appressed hairs; flowers long-peduncled; *calyx-lobes similar to the long and linear leaves*, surpassing the broad and crownless *purple-red petals*, falling off in fruit. (Agrostémma Githago, *L.*) — In wheat-fields. (Adv. from Eu.)

**L. Flos-cùculi**, L. (Ragged Robin.) Perennial, erect, slightly downy below, viscid above; leaves narrowly lanceolate; flowers in loose panicles; calyx short, glabrous; petals red, 4-lobed, lobes linear. — Moist or marshy places; New Eng. and N. Y. (Adv. from Eu.)

## 6. ARENÀRIA, L. Sandwort.

Sepals 5. Petals 5, entire, sometimes barely notched, rarely wanting. Stamens 10. Styles 3, rarely more or fewer, opposite as many sepals. Pod short, splitting into as many or twice as many valves as there are styles, few – many-seeded. — Low, usually tufted herbs, with sessile exstipulate leaves and small white flowers. (Name from *arena*, sand, in which many of the species grow.) — The following sections are by many botanists taken for genera.

§ 1. ARENARIA proper. *Pod splitting wholly or part-way down into* 3 *or at length into* 6 *valves; seeds many, naked at the hilum.*

**A. serpyllifòlia**, L. (Thyme-leaved Sandwort.) Diffusely branched, roughish (2 – 6′ high); leaves ovate, acute, small; cymes leafy; sepals lanceolate, pointed, 3 – 5-nerved, about equalling the petals and 6-toothed pod. — A low annual; sandy waste places. June – Aug. (Nat. from Eu.)

§ 2. ALSÌNE. *Pod splitting to the base into* 3 *entire valves; seeds many, usually rough, naked at the hilum; flowers solitary and terminal or cymose; root in our species perennial, except in* n. 4.

* *Leaves small, rigid, awl-shaped or bristle-shaped.*

1. **A. Caroliniàna**, Walt. (Pine-barren S.) Densely tufted from a deep perpendicular root; *leaves closely imbricated*, but spreading, *awl-shaped, short, channelled;* branches naked and minutely glandular above, several-flowered; *sepals obtuse*, ovate, shorter than the pod. (A. squarrosa, *Michx.*) — In pure sand, S. New York, N. J., and southward along the coast. May – July.

2. **A. Michaùxii**, Hook. f. Erect, or usually diffusely spreading from a small root, smooth; *leaves slender, between awl-shaped and bristle-form*, with

many others *clustered* in the axils; cyme diffuse, naked, many-flowered; *sepals pointed, 3-ribbed*, ovate, as long as the pod. (A. stricta, *Michx.*) — Rocks and dry wooded banks, Vt. and Penn. to Minn., Mo., and southwestward. July.

3. **A. vérna,** L. Dwarf, alpine, densely matted, glabrous or (var. HIRTA) somewhat pubescent, 1-3′ high; leaves narrowly linear or awl-shaped; flowers loosely cymose; sepals lanceolate, pointed, 3-nerved, shorter than the pod. — Smuggler's Notch, Vt. (*Pringle*); north and westward. (Eu.)

* * *Leaves soft and herbaceous, filiform-linear; petals retuse or notched.*

4. **A. pátula,** Michx. Diffusely branched from the slender root; stems filiform (6-10′ long); branches of the cyme diverging; peduncles long; *sepals lanceolate, acuminate, 3-5-nerved.* (A. Pitcheri, *Nutt.*) — S. W. Va. to Ky., Ill., Kan., and southward.

5. **A. Grœnlándica,** Spreng. (MOUNTAIN S.) Densely tufted from slender roots, smooth; flowering stems filiform, erect (2-4′ high), few-flowered; *sepals oblong, obtuse, nerveless.* — Summit of the Shawangunk, Catskill, and Adirondack Mountains, N. Y., of the higher mountains of New Eng., and northward; alpine or subalpine. At Bath, Maine, on river-banks near the sea, and near Middletown, Ct. June-Aug. — Leaves and peduncles 3-6″ long; flowers large in proportion.

§ 3. MŒHRÍNGIA. *Parts of the flower sometimes in fours; pod as in § 1, but the young ovary 3-celled; seeds rather few, smooth, with a thickish appendage (strophiole) at the hilum; perennials, with flaccid broadish leaves.*

6. **A. lateriflòra,** L. Sparingly branched, erect, minutely pubescent; leaves oval or oblong, obtuse (½-1′ long); peduncles 2- (rarely 3-4-) flowered, soon becoming lateral; sepals oblong, obtuse. — Gravelly shores, etc., New Eng. to Penn., Mo., Minn., and northward. May, June. (Eu.)

§ 4. AMMADÈNIA. *Styles, cells of the ovary, and valves of the fleshy pod 3, rarely 4 or 5; seeds few, smooth, short-beaked at the naked hilum; disk under the ovary more prominent than usual, glandular, 10-lobed; flowers almost sessile in the axils, sometimes diœcious or polygamous; root perennial.*

7. **A. peploìdes,** L. Stems (simple or forking from long rootstocks, 6-10′ high) and ovate partly-clasping leaves (8-10″ long) very fleshy. (Honkenya peploides, *Ehrh.*) — Sands of the sea-shore, N. J. to Maine and northward. June. (Eu.)

## 7. STELLÀRIA, L. CHICKWEED. STARWORT.

Sepals 4-5. Petals 4-5, deeply 2-cleft, sometimes none. Stamens 8, 10, or fewer. Styles 3, rarely 4 or 5, opposite as many sepals. Pod ovoid, 1-celled, opening by twice as many valves as there are styles, several-many-seeded. Seeds naked. — Flowers (white) solitary or cymose, terminal, or appearing lateral by the prolongation of the stem from the upper axils. (Name from *stella*, a star, in allusion to the star-shaped flowers.)

* *Stems spreading, flaccid, marked longitudinally with one or two pubescent lines; leaves ovate or oblong, ½-2½′ long.*

**S. MÈDIA,** Smith. (COMMON CHICKWEED.) Annual or nearly so; *lower leaves on hairy petioles; petals shorter than the calyx*, 2-parted, stamens 3-10. — Everywhere in damp grounds. (Nat. from Eu.)

1. **S. pùbera,** Michx. (Great Chickweed.) Root perennial; *leaves all sessile; petals longer than the calyx,* deeply 2-cleft; stamens 10. — Shaded rocks, Penn. to Ind., and southward. May.

* * *Stems erect or spreading; wholly glabrous perennials, with sessile and narrow or small leaves; stamens usually* 10, *perigynous.*

+ *Scaly-bracted; petals 2-parted, equalling or surpassing the calyx.*

2. **S. longifòlia,** Muhl. (Long-leaved Stitchwort.) Stem erect, weak, often with rough angles (8 – 18′ high); *leaves linear, acutish at both ends, spreading; cymes naked and at length lateral, peduncled,* many-flowered, the slender *pedicels spreading;* petals 2-parted, longer than the calyx; seeds smooth. — Grassy places; common, especially northward. June, July. (Eu.)

3. **S. lóngipes,** Goldie. (Long-stalked S.) Shining or somewhat glaucous, very smooth; *leaves ascending, lanceolate or linear-lanceolate,* acute, *broadest at the base,* rather rigid; cyme terminal, few-flowered, the long *pedicels strictly erect;* petals longer than the calyx; seeds smooth. — Maine to Minn., rare; common farther north. (Eu.)

**S.** gramínea, L. Resembling the last; leaves linear-lanceolate, *broadest above the base; pedicels widely spreading; seeds* strongly but minutely *rugose.* — Becoming rather frequent. (Int. from Eu.)

4. **S. uliginòsa,** Murr. (Swamp S.) Stems weak, decumbent or diffuse, at length prolonged, leaving the naked and usually *sessile cymes lateral; leaves lanceolate or oblong,* veiny; petals and ripe *pods as long as the calyx; seeds roughened.* — Swamps and rills, Md. to N. Eng., and northward; rare. (Eu.)

+ + *Flowers terminal or in the forks of the stem or of leafy branches; bracts foliaceous; petals 2-parted, small or often none; styles 3 – 4; pod longer than the calyx.*

5. **S. crassifòlia,** Ehrh. Stems diffuse or erect, flaccid; *leaves rather fleshy,* varying from linear-lanceolate to oblong; *petals longer than the calyx,* or wanting; *seeds rugose-roughened.* — Springy places, eastern Ky. (*Short*), Ringwood, Ill. (*Vasey*), and northward. April – June. (Eu.)

6. **S. boreàlis,** Bigel. (Northern S.) Stems erect or spreading, flaccid, many times forked, at length resolved into a leafy cyme; leaves varying from broadly lanceolate to ovate-oblong; *petals 2 – 5, shorter than the calyx, or oftener none:* sepals acute; styles usually 4; *seeds smooth.* — Shaded or wet places, R. I. to Minn., and northward. June – Aug. — Var. alpéstris has the later flowers more cymose, and their bracts small and partly scarious, also the seeds obscurely reticulated or roughish. — Lake Superior, *Dr. Robbins.* (Eu.)

7. **S. humifùsa,** Rottb. Spreading or *creeping;* stems or branches (2′ high) 1 – 3-flowered; *leaves fleshy, ovate or oblong* (2 – 3″ long); *petals a little longer than the calyx:* seeds smooth. — Northern border of Maine on the St. John's (*G. L. Goodale*), and high northward. June. (Eu.)

## 8. HOLÓSTEUM, L. Jagged Chickweed.

Sepals 5. Petals 5, usually jagged or denticulate at the point. Stamens 3 – 5, rarely 10. Styles mostly 3. Pod ovoid, 1-celled, many-seeded, opening at the top by 6 teeth. Seeds rough, flattened on the back, attached by the inner face. — Annuals or biennials, with several (white) flowers in an umbel.

borne on a long terminal peduncle. (Name composed of ὅλος, *all*, and ὀστέον, *bone*, by antiphrasis, these plants being soft and tender.)

**H.** UMBELLÀTUM, L. Leaves oblong; peduncle and upper part of the stem glandular-pubescent; pedicels reflexed after flowering. — Hills around Lancaster, Penn., *Prof. Porter*, and Morris Co., N. J., *C. F. Austin.* (Nat. from Eu.)

### 9. CERÁSTIUM, L. MOUSE-EAR CHICKWEED.

Sepals 5, rarely 4. Petals as many, 2-lobed or cleft, rarely entire. Stamens twice as many, or fewer. Styles equal in number to the sepals and opposite them. Pod 1-celled, usually elongated, membranaceous, opening at the apex by twice as many teeth as there were styles, many-seeded. Seeds rough. — Flowers white, in terminal cymes. Our species have the petals 2-cleft or obcordate, the parts of the flower always in fives, and the exserted pods more or less curved. (Name from κέρας, *a horn*, alluding to the shape of the pod in many species.)

**C.** VISCÒSUM, L. (MOUSE-EAR CHICKWEED.) *Annual*, hairy and rather clammy, nearly erect (4 – 9′ high); *leaves ovate or obovate to oblong-spatulate;* bracts herbaceous; *flowers small* in close clusters at first; *pedicels even in fruit not longer than the acute sepals; petals shorter than the calyx.* (C. vulgatum, *L. Herb.*, and *Man.* The names of this and the next were transposed in the Linnæan herbarium, which has caused much confusion. They are here applied as originally by Linnæus, and by many recent botanists. Others substitute for this the later name, C. glomeràtum, *Thuill.*) — Grassy places, eastward and southward; not common. May – July. — Stamens often 5. (Nat. from Eu.)

**C.** VULGÀTUM, L. (LARGER M.) Perennial; stems clammy-hairy, spreading (6 – 15′ long); *leaves oblong;* upper bracts scarious-margined; *flowers larger* (sepals 2 – 3″ long), at first clustered, the fruiting *pedicels* longer, the earlier ones mostly much *longer than the obtuse sepals;* petals equalling the calyx. (C. viscosum, *L. Herb.*, and *Man.* C. triviàle, *Link.*) — Fields and copses; common, perhaps indigenous. May – July. (Nat. from Eu.)

1. **C. nùtans,** Raf. Annual, very clammy-pubescent; stems erect, slender, grooved, diffusely branched (6 – 20′ high); cyme loose and open, *many-flowered; leaves oblong-lanceolate,* acute, the lowest spatulate; peduncles mostly elongated; petals longer than the calyx; *pods nodding on the stalks, curved upward, thrice the length of the calyx.* — Moist places, Vt. to Minn., and southward. May – July.

2. **C. arvénse,** L. (FIELD CHICKWEED.) Perennial; stems ascending or erect, tufted, downy or nearly smooth, slender (4 – 8′ high), naked and *few – several-flowered* at the summit; *leaves linear or narrowly lanceolate;* petals obcordate, more than twice the length of the calyx; *pods scarcely longer than the calyx.* — Dry or rocky places. May – July. (Eu.)

Var. **oblongifòlium,** Holl. & Britt. Usually taller, pubescent; leaves narrowly or broadly oblong or oblong-lanceolate; pod about twice longer than the calyx. (C. oblongifolium, *Torr.*) — Rocky places, N. Y. to Minn., and southward. — Var. VILLÒSUM, Holl. & Britt. Similar but densely villous-pubescent, and the leaves lanceolate to ovate-lanceolate. — E. Penn.

### 10. SAGÌNA, L. PEARLWORT.

Sepals 4 or 5. Petals 4 or 5, undivided, or often none. Stamens as many as the sepals, rarely twice as many. Styles as many as the sepals and alternate with them. Pod many-seeded, 4 – 5-valved to the base; valves opposite the sepals. — Little, matted herbs, with thread-like or awl-shaped leaves, no stipules, and small flowers terminating the stems or branches; in summer. (Name from *sagina*, fattening; previously applied to the spurry.)

* *Parts of the flower in fours, rarely with some few in fives.*

1. **S. procúmbens,** L. Annual or perennial, *depressed or spreading* on the ground, glabrous; leaves linear-thread-shaped; *apex of the peduncle often hooked* soon after flowering; *petals shorter than the* broadly ovate obtuse *sepals*, sometimes none. — Springy places and damp rocks, coast of Maine to Penn. (Eu.)

2. **S. apétala,** L. *Annual, erect* or ascending; leaves ciliate at base or glabrous; *petals none* or very small; *peduncles always erect.* — Dry soil, Mass. to Penn.; scarce, seemingly native? (Eu.)

* * *Parts of the flower in fives, the stamens not rarely* 10.

3. **S. decúmbens,** Torr. & Gray. Annual, ascending; the peduncles and calyx with the margins of the upper leaves *at first glandular-pubescent;* leaves short, often bristly-tipped, not fascicled in the axils; peduncles slender; *petals equalling or shorter than the calyx;* pod oblong-ovate, nearly twice longer than the acutish sepals. (S. subulata, *Man.*, not *Wimm.*) — E. Mass., to Ill., Mo., and southward. — Var. SMÍTHII, a slender form, *apetalous*, at least in the later flowers. — Near Philadelphia, in waste ground, and in sandy fields at Somers' Point, N. J., *C. E. Smith.* Seeds minutely roughened.

4. **S. nodòsa,** Fenzl. Perennial, tufted, glabrous, or glandular above; stems ascending (3–5′ high); lower leaves thread-form, the upper short and awl-shaped, with minute ones *fascicled in their axils so that the branchlets appear knotty*, *petals much longer than the calyx.* — Wet sandy soil, along the coast of Maine and N. H., also Lake Superior, and northward. (Eu.)

### 11. BÙDA, Adans. SAND-SPURREY.

Sepals 5. Petals 5, entire. Stamens 2–10. Styles and valves of the many-seeded pod 3, very rarely 5, when the valves alternate with the sepals! Embryo not coiled into a complete ring. — Low herbs, mostly on or near the sea-coast, with filiform or linear somewhat fleshy opposite leaves, and smaller ones often clustered in the axils; stipules scaly-membranaceous; flowering all summer. (Named probably for the city so called.) — Genus also known as TISSA, Adans., SPERGULARIA, Presl, and LEPIGONUM, Wahlb. The species are very variously understood by European botanists, and are much confused, as well as the synonymy. Our forms are annual, or at the most biennial.

1. **B. rùbra,** Dumort. Nearly glabrous, the summit of the prostrate or ascending slender stems, peduncles, and sepals usually glandular-pubescent; leaves linear, flat, scarcely fleshy; stipules lanceolate, entire or cleft; pedicels longer than the bracts; *pods* and pink-red corolla small (1½″), *hardly equalling or exceeding the calyx; seeds rough with projecting points, semi-obovate* or *gibbous-wedge-shaped, wingless.* (Spergularia rubra, *Presl.*) — Dry sandy soil, New Eng. to Va., along and near the coast, but rarely maritime. (Eu.)

2. **B. marìna,** Dumort. More decidedly fleshy than the preceding, erect or ascending, usually pubescent, with ovate stipules, terete leaves, and pedicels 2–4″ long; sepals usually becoming 2–2½″ long, little shorter than the

pod; petals pale; *seeds obovate-rounded and roughened with points*, wingless or narrow-winged. (Spergularia salina, *Presl.* Tissa marina, *Britt.*) — Brackish sands, etc., coast of N. Eng. to Va., and southward. A form with smooth seeds is var. LEIOSPÉRMA, N. E. Brown. (S. media, *Presl.*) (Eu.)

Var. (?) **minor,** Watson. Small, ascending or decumbent; flowers smaller, on shorter pedicels (rarely 2″ long), the sepals and pod 1–1½″ long; seeds wingless, usually papillose. — Coast of N. H. and Mass.

3. **B. boreàlis,** Watson. Diffusely branched, glabrous; pedicels usually 2–4″ long; petals white; pod ovate, 2″ long, about twice longer than the sepals; seeds usually wingless, smooth or nearly so. (Tissa salina, *Britt.*) — On the coast, E. Maine to Labrador.

### 12. SPÉRGULA, L. SPURREY.

Stamens 5 or 10. Styles 5. The 5 valves of the pod opposite the sepals. Embryo spirally annular. Leaves in whorls. Otherwise as in Buda. (Name from *spargo*, to scatter, from the seeds.)

**S.** ARVÉNSIS, L. (CORN SPURREY.) Annual; leaves numerous in the whorls, thread-shaped (1–2′ long); stipules minute; flowers white, in a stalked panicled cyme; seeds rough. — Grain-fields. (Adv. from Eu.)

## ORDER 16. PORTULACÀCEÆ. (PURSLANE FAMILY.)

*Herbs, with succulent leaves, and regular but unsymmetrical flowers;* viz., *sepals fewer than the petals; the stamens opposite the petals when of the same number, but often indefinite; otherwise nearly as* Chickweeds.— Sepals 2. Petals 5, or sometimes none. Stamens mostly 5–20. Styles 2–8, united below, or distinct, stigmatic along the inside. Pod 1-celled, with few or many campylotropous seeds rising on stalks from the base. Embryo curved around mealy albumen. — Insipid and innocent herbs, with entire leaves. Corolla opening only in sunshine, mostly ephemeral, then shrivelling.

1. **Portulaca.** Stamens 7-20, on the partly adherent calyx Pod opening by a lid.
2. **Talinum.** Stamens more numerous than the petals, hypogynous Calyx deciduous. Pod many-seeded.
3. **Claytonia.** Stamens as many as the hypogynous petals, and attached to their base. Calyx persistent. Pod 3-6-seeded.

### 1. PORTULÀCA, Tourn. PURSLANE.

Calyx 2-cleft; the tube cohering with the ovary below. Petals 5, rarely 6, inserted on the calyx with the 7–20 stamens, fugacious. Style mostly 3–8-parted. Pod 1-celled, globular, many-seeded, opening transversely, the upper part (with the upper part of the calyx) separating as a lid. — Fleshy annuals, with mostly scattered leaves. (An old Latin name, of unknown meaning.)

P OLERÀCEA, L. (COMMON PURSLANE.) Prostrate, very smooth; leaves obovate or wedge-form; flowers sessile (opening only in sunny mornings); sepals keeled; petals pale yellow; stamens 7–12; style deeply 5–6-parted; flower-bud flat and acute. — Cultivated and waste grounds; common. Seemingly indigenous west and southwestward. (Nat. from Eu.)

1. **P. retùsa,** Engelm. Leaves often retuse; calyx-lobes obtuse in the bud; petals small or minute; style shorter, 3–4-cleft; seeds larger, sharply

tuberculate; otherwise like the last. — Ark. to Tex. and westward; reported from Kan., Iowa, and Minn.

2. **P. pilòsa,** L. Ascending or spreading, copiously hairy in the axils; leaves linear-subulate, nearly terete, 3 – 6″ long; petals red or purple. — Kan. to Tex., etc.

### 2. TALÌNUM, Adans.

Sepals 2, distinct and free, deciduous Petals 5, ephemeral. Stamens 10 – 30. Style 3-lobed at the apex. Pod 3-celled at the base when young, 3-valved, with many seeds on a globular stalked placenta. (Derivation obscure.)

1. **T. teretifòlium,** Pursh. Perennial; leafy stems low, tuberous at base; leaves linear, cylindrical; peduncle long (3 – 6′) and naked, bearing an open cyme of pink flowers (⅔′ broad); stamens 15 – 20. — Serpentine rocks, Penn., to Ind., Minn., and southward. June – Aug.

### 3. CLAYTÒNIA, Gronov. SPRING-BEAUTY.

Sepals 2, ovate, free, persistent. Stamens 5, adhering to the short claws of the petals. Style 3-cleft at the apex. Pod 1-celled, 3-valved, 3 – 6-seeded. — Our two species are perennials, sending up simple stems in early spring from a small deep tuber, bearing a pair of opposite leaves, and a loose raceme of pretty flowers. Corolla rose-color with deeper veins, opening for more than one day! (Named in honor of *Dr John Clayton*, one of our earliest botanists, who contributed to Gronovius the materials for the Flora Virginica.)

1. **C. Virgínica,** L. Leaves linear-lanceolate, elongated (3 – 6′ long). — Moist open woods; common, especially westward and southward.

2. **C. Caroliniàna,** Michx. Flowers rather smaller and fewer; leaves spatulate-oblong or oval-lanceolate (1 – 2′ long). — Maine to Minn., and southward along the Alleghanies.

## ORDER 17. ELATINÀCEÆ. (WATER-WORT FAMILY.)

*Little marsh annuals, with membranaceous stipules between the opposite dotless leaves, minute axillary flowers like those of the* Chickweeds, *but the pod 2–5-celled, and the seeds as in* St. John's-wort. The principal genus is

### 1. ELATÌNE, L. WATER-WORT.

Sepals 2 – 4, persistent. Petals 2 – 4, hypogynous. Stamens as many, rarely twice as many, as the petals. Styles, or sessile capitate stigmas, 2 – 4. Pod membranaceous, globose, 2 – 4-celled, several – many-seeded, 2 – 4-valved; the partitions left attached to the axis, or evanescent. Seeds cylindrical, straightish or curved, marked by both longitudinal and transverse lines. — Dwarf glabrous plants, usually rooting at the nodes, aquatic or terrestrial. (A Greek name for some obscure herb.)

1. **E. Americàna,** Arn. Tufted, 1′ high; leaves obovate, obtuse, 1 – 3″ long; flowers sessile, rarely opening in the aquatic form; sepals, petals, stamens, and stigmas 2, rarely 3; seeds 5 or 6 in each cell, rising from the base, marked by 9 or 10 longitudinal lines and 20 – 30 crossbars. — Margin of ponds,

etc., N. H. to Ill., Va., and southwestward. Pod very thin and delicate; the seeds large in proportion, straightish.

2. **E. triándra,** Schkuhr. Leaves oblanceolate or nearly lanceolate; petals and stamens commonly 3; seeds more slender, covering the axis — Ponds, Ill., Neb., and westward. (Eu.)

3. **E. brachyspérma,** Gray. Leaves oblong or oval with narrowed base; flowers mostly dimerous; seeds short-oblong, with 6 or 7 longitudinal lines and 10 - 12 crossbars. — Ill. and southwestward.

## ORDER 18. HYPERICÀCEÆ. (ST. JOHN'S-WORT FAMILY.)

*Herbs or shrubs, with opposite entire dotted leaves and no stipules, regular hypogynous flowers, the petals mostly oblique and convolute in the bud, and many or few stamens commonly collected in 3 or more clusters or bundles. Pod 1-celled with 2 – 5 parietal placentæ, and as many styles, or 3 – 7-celled by the union of the placentæ in the centre; dehiscence mostly septicidal.* — Sepals 4 or 5, imbricated in the bud, herbaceous, persistent. Petals 4 or 5, mostly deciduous. Styles persistent, at first sometimes united. Seeds numerous, small, anatropous, with no albumen. Embryo cylindrical. — Plants with a resinous juice, dotted with pellucid or dark glands, usually smooth. Leaves mostly sessile. Flowers solitary or cymose.

* Petals oblique, convolute, yellow; hypogynous glands none.

1. **Ascyrum.** Sepals 4, in 2 very unequal pairs. Petals 4. Stamens many, distinct.
2. **Hypericum.** Sepals 5, alike. Petals 5. Stamens usually many and in 3 or 5 clusters.

* * Petals equal, imbricate, purplish; glands alternating with the 3 stamen-clusters.

3. **Elodes.** Sepals and petals 5. Stamens usually 9. Ovary 3-celled.

### 1. ÁSCYRUM, L. ST. PETER'S-WORT.

Sepals 4; the two outer very broad and leaf-like; the inner much smaller. Petals 4, oblique, very deciduous, convolute in the bud. Stamens numerous; the filaments distinct and scarcely in clusters. Pod strictly 1-celled, 2 – 4-valved. — Low, rather shrubby, smooth plants, with pale black-dotted leaves, and nearly solitary light yellow flowers. (An ancient Greek name of some plant, from *α-*, *without*, and *σκύρος*, *roughness*.)

1. **A. stáns,** Michx. (ST. PETER'S-WORT.) Stem rather simple, 2-edged, 1 – 2° high, stout; *leaves oval or oblong, somewhat clasping*, thickish; flowers showy; outer sepals round-cordate, inner lanceolate; *petals obovate;* styles 3 or 4. — Pine barrens, Long Island to Penn., and southward. July, Aug.

2. **A. Crux-Ándreæ,** L. (ST. ANDREW'S CROSS.) Low, much branched and decumbent; *leaves narrowly obovate-oblong, contracted at the base*, thin; *petals linear-oblong;* styles 2, very short; pod flat. — Nantucket; pine barrens of N. J. to S. Ill., Neb., and southward. July - Sept. — Petals scarcely exceeding the outer sepals, approaching each other in pairs over them, in the form of a St. Andrew's cross.

### 2. HYPÉRICUM, Tourn. ST. JOHN'S-WORT.

Sepals 5, somewhat equal. Petals 5, oblique, convolute in the bud. Stamens commonly united or clustered in 3 – 5 parcels; no interposed glands.

Pod 1-celled or 3 – 5-celled. Seeds usually cylindrical. — Herbs or shrubs, with cymose yellow flowers. (An ancient Greek name, of obscure meaning.)

§ 1. *Stamens very numerous, 5-adelphous; styles 5, united below, the stigmas capitate; pod 5-celled, the placentæ turned far back into the cells; perennial herb; flowers very large.*

1. **H. Áscyron,** L. (Great St. John's-wort.) Stems 2 – 5° high; branches 2 – 4-angled; leaves (2 – 5′ long) ovate-oblong, partly clasping; petals narrowly obovate (1′ long), not deciduous until after they wither; pod ¾′ long, conical. (H. pyramidatum, *Ait.*) — Banks of rivers, New Eng. and Penn. to Iowa and Minn. July.

§ 2. *Stamens very numerous, obscurely if at all clustered; styles* 3 (n. 2 *excepted*), *more or less united into one, the stigmas not capitate except in* n. 10; *sepals mostly foliaceous.*

* *Bushy shrubs,* 1 – 6° *high, leafy to the top.*

+ *Styles* 5; *pod completely* 5-*celled.*

2. **H. Kalmiànum,** L. (Kalm's St. John's-wort.) Branches 4-angled; branchlets 2-edged; leaves crowded, glaucous, linear to oblanceolate (1 – 2′ long); flowers few in a cluster (1′ wide); pods ovate. — Wet rocks, Niagara Falls and northern lakes. Aug.

+ + *Styles* 3; *pod completely* 3-*celled.*

3. **H. prolíficum,** L. (Shrubby St. John's-wort.) Branchlets 2-edged; leaves narrowly oblong (1 – 2′ long), mostly obtuse, narrowed at the base; flowers numerous, in single or compound clusters; pods lanceolate to ovate, 4 – 6″ long. — N. J. to Mich., Minn., and southward. July – Sept. — Varies greatly in size, etc.

4. **H. densiflòrum,** Pursh. Exceedingly branched above, 1 – 6° high, the branches slender and crowded with smaller leaves; flowers smaller (½ – ⅔′ in diameter) and more numerous, in crowded compound cymes; pod 2 – 3″ long. (H. prolificum, var. densiflorum, *Gray.*) — Pine barrens of N. J. to glades of Ky., Ark., and southward.

* * *Perennial herbs or a little woody at the base.*

+ *Pod incompletely* 3 – 4-*celled.*

5. **H. galioìdes,** Lam. Slender, branching, woody below; *leaves linear-oblanceolate,* narrowed downward, ½ – 3′ long, mostly acute; flowers small in terminal and axillary cymes; sepals very narrow, 1½ – 3″ long; pod as long, ovate. — Del. to Ga. and E. Tenn.

6. **H. adpréssum,** Barton. Stem simple, herbaceous, from a slightly woody creeping base (1 – 2° high), obscurely 4-angled below and 2-edged above; *leaves ascending, lanceolate* or linear-oblong, often acute, thin; cyme terminal, leafy at the base, few-flowered; sepals linear-lanceolate, pods ovoid-oblong. — Moist places, Nantucket and R. I. to Penn., and southwestward. July – Aug. — Leaves 1½′ long. Petals bright yellow, 3 – 5″ long.

+ + *Pod* 1-*celled with* 3 *parietal placentæ.*

7. **H. dolabrifórme,** Vent. Stems branched from the decumbent base, woody below (6 – 20′ high), terete; *leaves linear-lanceolate,* widely spreading,

veinless; cyme leafy, few-flowered; *sepals oblong or ovate-lanceolate,* about the length of the very oblique petals (5 – 6″ long); *pods ovate-conical, pointed,* the walls very thick and hard. — Dry hills and rocks, barrens of Ky. and Tenn. June – Aug.

8. **H. cistifòlium,** Lam.! Stems mostly simple, herbaceous, with a somewhat woody base, angled with 4 very narrow salient lines (1 – 2° high); leaves narrowly oblong to nearly linear (1 – 3′ long), sessile with a somewhat clasping base; the cyme naked, compound, usually many-flowered; *sepals ovate; pods depressed-globular or ovoid-conical;* seeds large, oblong, very rough-pitted. (H. sphærocarpon, *Michx.*) — Rocky river-banks, S. W. Ohio, to Iowa and southward. July – Sept. — Flowers small.

9. **H. ellípticum,** Hook. Stem simple, herbaceous (10 – 20′ high), obscurely 4-angled; *leaves spreading, elliptical-oblong,* obtuse, usually narrower toward the subclasping base, thin; cyme nearly naked, rather few-flowered; *sepals oblong; pods ovoid, very obtuse;* seeds minutely striate. — Wet places, New Eng. and Penn. to Minn., and northward. July, Aug. — Petals light yellow, 3″ long.

10. **H. virgàtum,** Lam. Stem slender, strict, simple, sharply 4-angled, herbaceous (1 – 2° high); *leaves ascending,* opaque, ovate or oblong-lanceolate, acute ($\frac{1}{2}$ – 1′ long), closely sessile by a broad base; cyme compound, naked, the scattered flowers racemose on its ascending branches; *sepals herbaceous, erect,* enclosing the ovoid pod; *styles* 3, *separate,* with capitate stigmas. (H. angulosum, *Michx.*) — Wet pine barrens of N. J. and southward; Ky. July – Sept. — Petals copper-yellow, 4 – 5″ long.

§ 3. *Stamens very many, in* 3 *or* 5 *clusters; styles* 3, *separate and usually diverging; pod* 3-*celled; calyx erect; petals and anthers with black dots; perennials.*

**H.** PERFORÀTUM, L. (COMMON ST. JOHN'S-WORT.) Stem much branched and corymbed, somewhat 2-edged (producing runners from the base); leaves elliptical-oblong or linear-oblong, with pellucid dots; petals (deep yellow) twice the length of the *lanceolate acute sepals;* flowers numerous, in open leafy cymes. — Fields, etc. June – Sept. — Too well known as a pernicious weed, which it is difficult to extirpate. Juice very acrid. (Nat. from Eu.)

11. **H. maculàtum,** Walt. Conspicuously marked with both black and pellucid dots; stem terete, sparingly branched; leaves oblong or lance-ovate, the base either obtuse or somewhat clasping; *flowers crowded* (small); *petals pale yellow,* much longer than the *oblong sepals,* styles mostly not longer than the pod. (H. corymbosum, *Muhl.*) — Damp places; common. July – Sept. — Leaves larger and flowers much smaller than in the last; petals 2 – 3″ long, marked with black lines as well as dots. The ordinary northern form differs from the typical southern one in the shorter style and the more oblong less clasping leaves.

§ 4. *Stamens* 5 – 12, *distinct or in* 3 *clusters; pod* 1-*celled, with* 3 *strictly parietal placentæ; styles short, distinct, with capitate stigmas; petals oblong or linear; sepals narrow, erect; slender annuals, with* 4-*angular branches; flowering all summer.*

* *Stem simple or loosely branched; leaves linear to ovate, spreading.*

12. **H. mùtilum,** L. Stem flaccid, widely branching (6 – 20′ high); *leaves ovate to narrowly oblong, obtuse, partly clasping,* 5-*nerved;* cymes leafy;

flowers 2″ broad; *pods ovate-conical, rather longer than the calyx.* — Low grounds, everywhere.

13. **H. gymnánthum,** Engelm. & Gray. Almost simple, with strict stem and branches (1 – 3° high); leaves clasping, heart-shaped, acute or obtuse; cyme naked, the floral leaves reduced to small awl-shaped bracts; in aspect approaching the next. (H. mutilum, var. gymnanthum, *Gray.*) — Del. and Penn. to Minn., and southward.

14. **H. Canadénse,** L. Stem strict (6 – 15′ high), with the branches erect; *leaves linear, 3-nerved* at the base, obtuse; cymes naked; flowers deep yellow, 2 – 3″ broad when expanded; *pods conical-oblong, usually much longer than the calyx.* — Wet, sandy soil; common. June – Oct. — Var. MÀJUS, Gray, is a large form, 1 – 2° high, with lanceolate leaves 1½′ long, 3″ wide, the upper acute. L. Superior, *Robbins;* S. New York and southward. — Var. MINIMUM, Chois., a simple few-flowered form, 1 – 3′ high, with oblong obtuse leaves. On wet rocks, Wisc., and northward.

* * *Stems fastigiately branched; leaves linear or bract-like, ascending or appressed.*

15. **H. Drummóndii,** Torr. & Gray. Stem and the mostly alternate bushy branches rigid, erect (10 – 18′ high); *leaves linear-subulate,* nearly erect, 1-*nerved* (3 – 9″ long); *flowers scattered* along the upper part of the leafy branches, *short-pedicelled; pods ovoid, not longer than the calyx.* — W. Ill., Iowa, Kan., and southward, in dry soil.

16. **H. nudicaùle,** Walt. (ORANGE-GRASS. PINE-WEED.) Stem and bushy branches thread-like, wiry (4 – 9′ high); *leaves minute awl-shaped scales, appressed; flowers minute, mostly sessile* and scattered along the erect branches; *pods ovate-lanceolate,* acute, *much longer than the calyx.* (H. Sarothra, *Michx.*) — Sandy fields, N. Eng. to Ill., Mo., and southward; common. June – Oct.

### 3. ELÒDES, Adans. MARSH ST. JOHN'S-WORT.

Sepals 5, equal, erect. Petals 5, equal-sided, oblong, naked, imbricated in the bud. Stamens 9 (rarely more), united in 3 sets; the sets separated by as many large orange-colored glands. Pod 3-celled, oblong; styles distinct. — Perennial herbs, in marshes or shallow water, with small close clusters of flesh-colored flowers in the axils of the leaves and at the summit of the stem. (Name ἑλώδης, *growing in marshes,* accidentally changed to ELODÈA by Jussieu, who was followed by Pursh, etc.)

1. **E. campanulàta,** Pursh. *Leaves closely sessile or clasping by a broad base,* oblong or ovate, very obtuse; filaments united below the middle. (E. Virginica, *Nutt.*) — Common in swamps; 1 – 2° high. July, Aug.

2. **E. petiolàta,** Pursh. Taller, more branching; *leaves tapering into a short petiole, oblong:* filaments united beyond the middle. — From Va. south and westward.

## ORDER 19. TERNSTRŒMIÀCEÆ. (TEA OR CAMELLIA FAMILY.)

*Trees or shrubs, with alternate simple feather-veined leaves, and no stipules, the regular flowers hypogynous and polyandrous, the sepals and petals* *both imbricated in æstivation, the stamens more or less united at the base with each other (monadelphous or 3 - 5-adelphous) and with the base of the petals.* — Anthers 2-celled, introrse. Fruit a woody 3 - 5-celled loculicidal pod. Seeds few, with little or no albumen. Embryo large, with broad cotyledons. — A family with showy flowers, the types of which are the well-known CAMELLIA and the more important TEA PLANT, — represented in this country by the two following genera.

### 1. STUÁRTIA, L.

Sepals 5, rarely 6, ovate or lanceolate. Petals 5, rarely 6, obovate, crenulate. Stamens monadelphous below. Pod 5-celled. Seeds 1 or 2 in each cell, crustaceous, anatropous, ascending. Embryo straight, nearly as long as the albumen; radicle longer than the cotyledons. — Shrubs with membranaceous deciduous oblong-ovate serrulate leaves, soft-downy beneath, and large short-peduncled flowers solitary in their axils. (Named for *John Stuart*, Marquis of Bute.)

1. **S. Virgínica,** Cav. Petals 5, white (1′ long); sepals ovate; style 1; stigma 5-toothed; pod globular, blunt; seeds not margined. — Woods, Va., and southward.

2. **S. pentágyna,** L'Her. Leaves larger, 5 - 6′ long; sepals acute; petals often 6; styles 5, distinct; pod angled, pointed; seeds wing-margined. — Mountains of Ky., Car., and southward.

### 2. GORDÒNIA, Ellis. LOBLOLLY BAY.

Sepals 5, rounded, concave. Petals 5, obovate. Stamens 5-adelphous, one cluster adhering to the base of each petal. Style 1. Pod ovoid, 5-valved; the valves separating from the persistent axis; cells 2 - 8-seeded. Seeds pendulous. Embryo straightish, with a short radicle, and thin longitudinally plaited cotyledons. — Shrubs or small trees, with large and showy white flowers on axillary peduncles. (Dedicated by Dr. Garden to his "old master, *Dr. James Gordon* of Aberdeen," and by Ellis to a London nurseryman of the same name.)

1. **G. Lasiánthus,** L. (LOBLOLLY BAY.) Leaves coriaceous and persistent, lanceolate-oblong, narrowed at the base, minutely serrate, smooth and shining; pod pointed; seeds winged above. — Swamps near the coast, Va. and southward. May - July. — Petals 1½′ long.

## ORDER 20. MALVÀCEÆ. (MALLOW FAMILY.)

*Herbs or shrubs, with alternate stipulate leaves and regular flowers, the calyx valvate and the corolla convolute in the bud, numerous stamens monadelphous in a column, and united at base with the short claws of the petals, 1-celled anthers, and kidney-shaped seeds.* — Sepals 5, united at base, persistent, often involucellate with a whorl of bractlets forming a sort of exterior calyx. Petals 5. Anthers kidney-shaped, opening along the top. Pistils several, the ovaries united in a ring or forming a several-celled pod. Seeds with little albumen; embryo curved, the leafy cotyledons variously doubled up. — Mucilaginous, innocent plants, with tough bark and palmately-veined leaves. Flower-stalks with a joint, axillary.

**Tribe I. MALVEÆ.** Columns of stamens anther-bearing at the top. Ovaries and carpels 5 - 20 or more, closely united in a ring around a central axis, from which they separate after ripening.

* Stigmas occupying the inner face of the styles; carpels 1-seeded, falling away separately.

1. **Althæa.** Involucel of 6 to 9 bractlets.
2. **Malva.** Involucel of 3 bractlets. Petals obcordate. Carpels rounded, beakless.
3. **Callirrhoe.** Involucel of 1 - 3 bractlets or none. Petals truncate. Carpels beaked.
4. **Napæa.** Involucel none Flowers diœcious. Stamens few (15 - 20). Carpels beakless.

* * Stigmas terminal, capitate; carpels 1 - few-seeded, usually dehiscent.

5. **Malvastrum.** Involucel of 3 bractlets or none. Seed solitary, filling the cell, ascending.
6. **Sida.** Involucel none. Seed solitary in the cells, pendulous.
7. **Sphæralcea.** Bractlets 3. Seeds 2 or 3 in each cell.
8. **Abutilon.** Involucel none. Seeds 3 - 9 in each cell.
9. **Modiola.** Bractlets 3. Seeds 2 in each cell, with a transverse partition between them.

**Tribe II. HIBISCEÆ.** Column of stamens anther-bearing for a considerable part of its length, naked and 5-toothed at the very apex. Pod mostly 5-celled, loculicidal, leaving scarcely any axis in the centre after opening.

10. **Kosteletzkya.** Involucel of several bractlets. Pod 5-celled, 5-seeded.
11. **Hibiscus.** Involucel of many bractlets. Pod 5-celled, many-seeded.

## 1. ALTHÆ̀A, L. Marsh-Mallow.

Calyx surrounded by a 6 - 9-cleft involucel. Otherwise as in Malva. (Old Greek and Latin name, from ἄλθω, *to cure*, in allusion to its healing properties.)

**A.** officinàlis, L. (Marsh-Mallow.) Stem erect, 2 - 4° high; leaves ovate or slightly heart-shaped, toothed, sometimes 3-lobed, velvety-downy; peduncles axillary, many-flowered; flowers pale rose-color. — Salt marshes, coast of N. Eng. and N. Y. Aug., Sept. — Perennial root thick, abounding in mucilage, the basis of the *Pâtes de Guimauve*. (Nat. from Eu.)

## 2. MÁLVA, L. Mallow.

Calyx with a 3-leaved involucel at the base, like an outer calyx. Petals obcordate. Styles numerous, stigmatic down the inner side. Fruit depressed, separating at maturity into as many 1-seeded and indehiscent round kidney-shaped blunt carpels as there are styles. Radicle pointing downward. (An old Latin name, from the Greek name, μαλάχη, having allusion to the emollient leaves.)

* *Flowers fascicled in the axils.*

**M.** rotundifòlia, L. (Common Mallow.) *Stems procumbent* from a deep biennial root; *leaves* round-heart-shaped, on very long petioles, crenate, *obscurely-lobed;* petals twice the length of the calyx, whitish; carpels pubescent, even. — Waysides and cultivated grounds; common. (Nat. from Eu.)

**M.** sylvéstris, L. (High M.) Biennial; *stem erect, branched* (2 - 3° high); *leaves sharply* 5 - 7-*lobed;* petals thrice the length of the calyx, large, purple and rose-color; carpels wrinkled-veiny. — Waysides. (Adv. from Eu.)

**M.** críspa, L. (Curled M.) A *tall, erect* annual, with round and angled toothed and *crisped leaves*, and small *sessile flowers* crowded in the axils. — Sparingly escaped from old gardens. (Adv. from Eu.)

* * *Flowers only in the upper axils, somewhat racemose or paniculate.*

**M.** moschàta, L. (Musk M.) A low perennial, with the *stem-leaves* 5-*parted, and the divisions once or twice parted or cleft* into linear lobes, faintly musky-scented, the *flowers rose-color* or white (1½′ in diameter) on short peduncles crowded on the stem and branches, the fruit downy. — Escaped from gardens to waysides. (Adv. from Eu.)

**M. Álcea**, L., with the *stem-leaves only once 5-parted or cleft*, the lobes incised, large flowers like the last, but the fruit smooth, and bractlets of the involucel ovate, has escaped from gardens. (Adv. from Eu.)

### 3. CALLÍRRHOË, Nutt.

Calyx either naked or with a 3-leaved involucel at its base. Petals wedge-shaped and truncate (usually red-purple). Styles, etc., as in Malva. Carpels 10–20, straightish, with a short empty beak, separated within from the 1-seeded cell by a narrow projection, indehiscent or partly 2-valved. Radicle pointing downward. (Name drawn from Greek mythology.)

* *Involucel 3-leaved.*

1. **C. triangulàta,** Gray. Hairy-pubescent; stems nearly erect (2° high) from a fusiform root; leaves triangular or halberd-shaped, or the lowest rather heart-shaped, coarsely crenate; the upper incised or 3–5-cleft; flowers panicled, short-pedicelled (purple); involucel as long as the 5-cleft 5-nerved calyx; carpels not rugose. — Dry prairies, Ind. to Minn., and southward.

2. **C. involucràta**, Gray. Hirsute or hispid, procumbent; leaves rounded, 5–7-parted or -cleft, the segments incisely lobed; peduncles elongated, 1-flowered; calyx 5-parted, the lanceolate 3–5-nerved sepals twice as long as the involucel; petals red or purplish, carpels indehiscent, rugose-reticulated. — Minn. to Tex.

* * *Involucel none; calyx 5-parted; carpels strongly rugose.*

3. **C. alcæoìdes,** Gray. Strigose-pubescent; stems slender (1° high), erect from a perennial root; lower leaves triangular-heart-shaped, incised, the upper 5–7-parted, laciniate, the uppermost divided into linear segments; flowers (rose-color or white) corymbose, on slender peduncles. — Barren oak-lands, S. Ky. to Kan. and Neb.

4. **C. digitàta,** Nutt. Sparsely hirsute or glabrous, erect; leaves few, round-cordate, 5–7-parted, the cauline commonly with linear divisions; peduncles subracemose, long, filiform; flowers red-purple to white. — Kan. to Tex.

### 4. NAPÆA, Clayt. GLADE MALLOW.

Calyx naked at the base, 5-toothed. Petals entire. *Flowers diœcious;* the staminate flowers destitute of pistils, with 15–20 anthers; the fertile with a short column of filaments but usually no anthers. Styles 8–10, stigmatic along the inside. Fruit depressed-globular, separating when ripe into as many kidney-shaped 1-seeded beakless and scarcely dehiscent carpels as there are styles. Radicle pointing downward. — A tall roughish perennial herb, with very large 9–11-parted lower leaves, the pointed lobes pinnatifid-cut and toothed, and with small white flowers in panicled clustered corymbs. (Named from νάπη, a glade or dell, or, poetically, a nymph of the glades.)

1. **N. diòica,** L. Stems nearly simple, 5–9° high. — Penn. to Va., and west to Iowa and Minn.; rare. July.

### 5. MALVÁSTRUM, Gray. FALSE MALLOW.

Calyx with an involucel of 2 or 3 bractlets, or none. Petals notched at the end or entire. Styles 5 or more; stigmas capitate. Carpels as in Malva, or else as in Sida, but the solitary kidney-shaped seed ascending and the radicle pointing downward, as in the former. (Name altered from *Malva*.)

1. **M. angústum,** Gray. Annual, slightly hairy, erect (6′–1° high); leaves lance-oblong or linear, with scattered fine callous teeth; flowers in the upper axils, on peduncles shorter than the broadly ovate-triangular sepals; bractlets and stipules setaceous; petals yellow, scarcely exceeding the calyx; carpels 5, kidney-shaped, smooth, at length 2-valved. — W. Tenn. to Iowa and Kan. Aug.

2 **M. coccíneum,** Gray. Perennial, low and hoary; leaves 5-parted or pedate, flowers in short spikes or racemes, the pink-red petals very much longer than the calyx; carpels 10 or more, reticulated on the sides and indehiscent. — Minn to W. Tex., and westward.

## 6. SÌDA, L.

Calyx naked at the base, 5-cleft. Petals entire, usually oblique. Styles 5 or more, tipped with capitate stigmas; the ripe fruit separating into as many 1-seeded carpels, which are closed, or commonly 2-valved at the top, and tardily separate from the axis. Seed pendulous. Embryo abruptly bent; the radicle pointing upward. (A name used by Theophrastus.)

1. **S. Napæ̀a,** Cav. A smooth, tall (4–10° high) perennial; *leaves* 3–7-*cleft*, the lobes oblong and pointed, toothed; *flowers* (*white*) *umbellate-corymbed*, 1′ wide; carpels 10, pointed. — Rocky river-banks, along the Alleghanies, Penn. to Va.; rare. (Cultivated in old gardens.)

2. **S. Ellióttii,** Torr. & Gray. A smooth, erect perennial (1–4° high); *leaves linear*, serrate, short-petioled; peduncles axillary, 1-flowered, short; *flowers* (*yellow*) rather large; *carpels* 9–10, *slightly and abruptly pointed*, forming a depressed fruit. — Sandy soil, S. Va. and southward. May–Aug.

**S.** SPINÒSA, L. Annual weed, minutely and softly pubescent, low (10–20′ high), much branched; *leaves ovate-lanceolate or oblong*, serrate, rather long-petioled; peduncles axillary, 1-flowered, shorter than the petiole; *flowers* (*yellow*) small; *carpels* 5, combined into an ovate fruit, *each splitting at the top into* 2 *beaks*. — A little tubercle at the base of the leaves on the stronger plants gives the specific name, but it cannot be called a spine. — Waste places, S. New York to Iowa, and common southward. (Nat. from the tropics.)

## 7. SPHÆRÁLCEA, St. Hil.

Ovules and seeds usually 2 or 3 in each cell. Characters otherwise as in Malvastrum. (Name from σφαῖρα, *a sphere*, and ἀλκέα, *a mallow* — from the commonly spherical fruit.)

1. **S. acerifòlia,** Nutt. Perennial, erect, 2–6° high, stellately pubescent or glabrate; leaves maple-shaped, 3–7-cleft; flowers clustered in the upper axils and subspicate, rose-color to white. — Kankakee Co., Ill., *E. J. Hill*; Dak. and westward.

## 8. ABÙTILON, Tourn. INDIAN MALLOW.

Carpels 2–9-seeded, at length 2-valved. Radicle ascending or pointing inward. Otherwise as in Sida. (Name of unknown origin.)

**A.** AVICÉNNÆ, Gaertn. (VELVET-LEAF.) Tall annual (4° high); leaves roundish-heart-shaped, taper-pointed, velvety; peduncles shorter than the leaf-stalks; corolla yellow; carpels 12–15, hairy, beaked. — Waste places, escaped from gardens. (Adv. from India.)

### 9. MODÌOLA, Moench.

Calyx with a 3-leaved involucel. Petals obovate. Stamens 10–20. Stigmas capitate. Carpels 14–20, kidney-shaped, pointed, and at length 2-valved at the top; the cavity divided into two by a cross partition, with a single seed in each cell. — Humble, procumbent or creeping annuals or biennials, with cut leaves and small purplish flowers solitary in the axils. (Name from *modiolus*, the broad and depressed fruit resembling in shape the Roman measure of that name.)

1. **M. multífida,** Moench. Hairy; leaves 3–5-cleft and incised; stamens 15–20; fruit hispid at the top. — Low grounds, Va. and southward.

### 10. KOSTELÉTZKYA, Presl.

Pod depressed, with a single seed in each cell. Otherwise as Hibiscus. (Named after *V. F. Kosteletzky*, a Bohemian botanist.)

1. **K. Virgínica,** Gray. Roughish-hairy perennial (2–4° high); leaves halberd-shaped and heart-shaped, the lower 3-lobed; corolla 2′ wide, rose-color; column slender. — Marshes on the coast, N. Y. and southward. Aug.

### 11. HIBÍSCUS, L. Rose-Mallow.

Calyx involucellate at the base by a row of numerous bractlets, 5-cleft. Column of stamens long, bearing anthers for much of its length. Styles united, stigmas 5, capitate. Fruit a 5-celled loculicidal pod. Seeds several or many in each cell. — Herbs or shrubs, usually with large and showy flowers. (An old Greek and Latin name of unknown meaning.)

* *Indigenous tall perennials* (4–8° *high*), *flowering late in summer.*

1. **H. Moscheùtos,** L. (Swamp Rose-Mallow.) *Leaves ovate,* pointed, toothed, the lower 3-lobed, the uppermost oblong-lanceolate, all whitened underneath with a fine soft down, glabrous or slightly downy above; the 1-flowered peduncles sometimes united at the base with the petioles; bractlets not hairy; *calyx not inflated; pod and seeds smooth* or nearly so. — Brackish marshes along the coast, from E. Mass. southward, and lake shores and swamps westward to Ill. and Mo., especially within the influence of salt springs. — Corolla 5–6′ in diameter, light rose-color or white, with or without a crimson eye.

2. **H. lasiocárpus,** Cav. Leaves soft-downy both sides, the lower broadly ovate and heart-shaped; bractlets ciliate; pod hirsute; — otherwise resembling the last. (H. grandiflorus, *Michx.*) — Ind. to Mo., and southward.

3. **H. militàris,** Cav. (Halberd-Leaved R.) *Smooth throughout;* lower leaves ovate-heart-shaped, toothed, 3-lobed; *upper leaves halberd-form,* the short lateral lobes spreading at the base, the middle one prolonged and taper-pointed; peduncles slender; *fruiting calyx inflated; seeds hairy.* — River-banks, Penn. to Minn., and southward. — Corolla 2–3′ long, flesh-color with purple base.

* * *Escaped from gardens or grounds.*

**H.** Triònum, L. (Bladder Ketmia.) A low, rather *hairy annual;* upper leaves 3-parted, with lanceolate divisions, the middle one much the longest; fruiting *calyx inflated, membranaceous,* 5-*winged;* corolla sulphur-yellow with a blackish eye, ephemeral; hence the name *flower-of-an-hour.* (Adv. from Eu.)

**H.** Syrìacus, L. (Shrubby Althæa of gardeners.) *Tall shrub,* smooth; leaves wedge-ovate, pointed, cut-toothed or lobed; corolla usually rose-color. — Escaped rarely from cultivation, Penn., etc. Sept. (Adv. from Eu.)

## ORDER 21. TILIÀCEÆ. (LINDEN FAMILY.)

*Trees (rarely herbs), with the mucilaginous properties, fibrous bark, valvate calyx, etc., of the* Mallow Family; *but the sepals deciduous, petals imbricated in the bud, the stamens usually polyadelphous, and the anthers 2-celled.* Represented in Northern regions only by the genus,

### 1. TÍLIA, Tourn. LINDEN. BASSWOOD.

Sepals 5. Petals 5, spatulate-oblong. Stamens numerous; filaments cohering in 5 clusters with each other (in European species), or with the base of a spatulate petal-like body placed opposite each of the real petals. Pistil with a 5-celled ovary, and 2 half-anatropous ovules in each cell, a single style, and a 5-toothed stigma. Fruit dry and woody, indehiscent-globular, becoming 1-celled and 1 – 2-seeded. Embryo in hard albumen; cotyledons broad and thin, 5-lobed, crumpled. — Fine trees, with soft and white wood, very fibrous and tough inner bark, more or less heart-shaped and serrate alternate leaves (oblique and often truncate at the base), deciduous stipules, and small cymes of flowers, hanging on an axillary peduncle which is united to a ligulate membranaceous bract. Flowers cream-color, honey-bearing, fragrant. (The classical Latin name.)

1. **T. Americàna,** L. (BASSWOOD.) Leaves large, green and glabrous or nearly so, thickish; floral bract usually tapering at base; fruit ovoid. — Rich woods. May, June. — Here rarely called *Lime-tree*, oftener *White-wood*, commonly *Basswood;* the latter name now obsolete in England.

2. **T. pubéscens,** Ait. Leaves smaller (2 – 3′ long), thinner, and rather pubescent beneath; floral bract usually rounded at base; fruit globose, smaller (3″ broad). (T. Americana, var. pubescens, *Man.*) — N. Y. to Fla., and westward.

3. **T. heterophýlla,** Vent. (WHITE BASSWOOD.) Leaves larger, smooth and bright green above, silvery-whitened with a fine down underneath. — Mountains of Penn. to S. Ill., and southward.

**T.** EUROPÆA, the EUROPEAN LINDEN, several varieties of which are planted in and near our cities for shade, is at once distinguished from any native species by the absence of the petal-like scales among the stamens. This tree (the *Lin*) gave the family name to *Linnæus.*

## ORDER 22. LINÀCEÆ. (FLAX FAMILY.)

*Herbs (rarely shrubs) with the regular and symmetrical hypogynous flowers* 4 – 6-*merous throughout, strongly imbricated calyx and convolute petals,* 5 *stamens monadelphous at base, and an* 8 – 10-*seeded pod, having twice as many cells as there are styles.* Represented by the genus,

### 1. LÌNUM, Tourn. FLAX.

Sepals (persistent), petals, stamens, and styles 5, regularly alternate with each other. Pod of 5 united carpels (into which it splits in dehiscence) and 5-celled, with 2 seeds hanging from the summit of each cell, which is partly or completely divided into two by a false partition projecting from the back of the carpel, the pod thus becoming 10-celled. Seeds anatropous, mucilaginous, flattened, containing a large embryo with plano-convex cotyledons. — Herbs, with tough fibrous bark, simple and sessile entire leaves (alternate or often opposite), without stipules, but often with glands in their place, and with corymbose or panicled flowers. Corolla usually ephemeral. (The classical name of the Flax.)

* *Flowers rather small, yellow; glabrous,* 1 – 2° *high.*

1. **L. Virginiànum,** L. Stem erect from the base and with the corymbose spreading or recurving *branches terete and even;* no stipular glands; leaves oblong or lanceolate, or the lower spatulate and often opposite; flowers scattered, small (barely 3″ long); sepals ovate, pointed, smooth-edged or nearly so, equalling the depressed 10-celled pod; styles distinct. — Dry woods; common. — Root apparently annual; but the plant propagates by suckers from the base of the stem.

**L.** FLORIDÀNUM, Trelease, of rather stricter habit and the pods broadly ovate and obtuse, appears to have been found in S. Ill.

2. **L. striàtum,** Walt. Stems gregarious, erect or ascending from a creeping or decumbent base, slightly viscid, and with the mostly racemose short *branches striate with about* 4 *sharp wing-like angles* decurrent from the leaves; these broader than in the last, and mostly oblong, usually with all the lower ones opposite; flowers more crowded; sepals scarcely equalling the very small subglobose brownish pod; otherwise nearly as n. 1. — Wet or boggy grounds, E. Mass. to Lakes Ontario and Huron, Ill., and southward.

3. **L. sulcàtum,** Riddell. Stem strictly erect from an annual root, and with the upright or ascending branches wing-angled or grooved; leaves alternate, linear, acute, the upper subulate and glandular-serrulate; a pair of *dark glands in place of stipules;* sepals ovate-lanceolate and sharp-pointed, strongly 3-nerved and with rough-bristly-glandular margins, scarcely longer than the ovoid-globose incompletely 10-celled pod; *styles united* almost to the middle. — Dry soils, E. Mass. to Minn., and southwestward. — Flowers and pods twice as large as in the preceding.

4. **L. rígidum,** Pursh. Glaucous, sometimes slightly puberulent, often low and cespitose, the rigid branches angled; leaves narrow, erect, usually with stipular glands; flowers large; sepals lanceolate, glandular-serrulate; styles united; capsule ovoid, 5-valved. — Minn. to Kan., and southward.

* * *Flowers large, blue.*

5. **L. perénne,** L., var. **Lewísii,** Eat. & Wright. Perennial, glabrous and glaucous, 1 - 3° high; leaves linear, acute; flowers rather few on long peduncles; sepals obtuse or acutish, not glandular-serrulate; styles distinct; pod ovate. — Minn. to Neb., and westward. (Eu., Asia.)

L. USITATÍSSIMUM, L. (COMMON FLAX.) Annual; stem corymbosely branched at top; sepals acute, ciliate. — Occasionally spontaneous in fields. (Adv. from Eu.)

## ORDER 23. GERANIÀCEÆ. (GERANIUM FAMILY.)

*Plants (chiefly herbs) with perfect and generally symmetrical hypogynous flowers; the stamens, counting sterile filaments, as many or commonly twice as many, and the lobes or cells (1 – few-ovuled) of the ovary as many, as the sepals, the axis of the dry fruit persisting.* — Seeds without albumen except in Oxalis. Flowers mostly 5-merous and the sepals usually distinct. Leaves never punctate. An order not easily defined, and including several strongly marked tribes or suborders which have been regarded by many botanists as distinct.

**Tribe I. GERANÌEÆ.** (GERANIUM FAMILY proper.) Flowers regular, 5-merous, the sepals imbricate in the bud, persistent. Glands of the disk 5, alternate with the petals. Stamens somewhat united. Ovary deeply lobed; carpels 5, 2-ovuled, 1-seeded, separating elastically with their long styles, when mature, from the elongated axis. Cotyledons plicate, incumbent on the radicle. — Herbs (our species) with more or less lobed or divided leaves, stipules, and astringent roots.

1. **Geranium.** Stamens with anthers 10, rarely 5. The recurving bases of the styles or tails of the carpels in fruit naked inside.

2. **Erodium.** Stamens with anthers only 5. Tails of the carpels in fruit bearded inside, often spirally twisted.

**Tribe II. LIMNÁNTHEÆ.** Flowers regular, 3-merous (in Flœrkea), the persistent sepals valvate. Glands alternate with the petals. Stamens distinct. Carpels nearly distinct, with a common style, 1-ovuled, 1-seeded, at length fleshy and indehiscent, not beaked, separating from the very short axis. Embryo straight; cotyledons very thick; radicle very short. — Low tender annuals, with alternate pinnate leaves and no stipules.

3. **Flœrkea.** Sepals, minute pistils, and lobes of the ovary 3; stamens 6.

**Tribe III. OXALÍDEÆ.** (SORREL FAMILY) Flowers regular, 5-merous, the persistent sepals imbricate. Glands none. Stamens 10, often united at base. Stigmas capitate. Fruit a 5-celled loculicidal pod (in Oxalis); cells 2 - several-seeded. Embryo straight, in a little fleshy albumen. — Leaves compound (3-foliolate in our species): juice sour.

4. **Oxalis.** Styles 5, separate. Pod oblong; the valves not falling away. Leaflets usually obcordate.

**Tribe IV. BALSAMÍNEÆ.** (BALSAM FAMILY.) Flowers irregular (5-merous as to the stamens and pistil), the petals and colored sepals fewer in number, deciduous, the larger sepal with a large sac or spur. Glands none. Stamens 5, distinct, short. Fruit a fleshy 5-celled pod (in Impatiens); cells several-seeded. Embryo straight. — Tender and very succulent herbs, with simple leaves and no stipules.

5. **Impatiens.** Lateral petals unequally 2-lobed. Pod bursting elastically into 5 valves.

## 1. GERÀNIUM, Tourn. CRANESBILL.

Stamens 10 (sometimes only 5 in n. 3), all with perfect anthers, the 5 longer with glands at their base (alternate with the petals). Styles smooth inside in fruit when they separate from the axis. — Stems forking. Peduncles 1 - 3-flowered. (An old Greek name, from γέρανος, *a crane;* the long fruit-bearing beak thought to resemble the bill of that bird.)

* *Rootstock perennial.*

1. **G. maculàtum,** L. (WILD CRANESBILL.) Stem erect, hairy; leaves about 5-parted, the wedge-shaped divisions lobed and cut at the end; sepals slender-pointed; petals entire, light purple, bearded on the claw (½′ long). — Open woods and fields. April - July. — Leaves somewhat blotched with whitish as they grow old.

* * *Root biennial or annual; flowers small.*

+- *Leaves ternately much-dissected; heavy scented.*

2. **G. Robertiànum,** L. (HERB ROBERT.) Sparsely hairy, diffuse, strong-scented; leaves 3-divided or pedately 5-divided, the divisions twice pin-

natifid; sepals awned, shorter than the (red-purple) petals; carpels wrinkled; seeds smooth. — Moist woods and shaded ravines; N. Eng. to Mo., and northward. June – Oct. (Eu.)

+ + *Leaves palmately lobed or dissected.*

3. **G. Caroliniànum,** L. Stems at first erect, diffusely branched from the base, hairy; leaves about 5-parted, the divisions cleft and cut into numerous oblong-linear lobes; peduncles and pedicels short; *sepals awn-pointed,* as long as the emarginate (pale rose-colored) petals; carpels hairy; *seeds ovoid-oblong, very minutely reticulated.* — Barren soil and waste places; common. May – Aug. — Depauperate forms, except by the seeds, are hardly distinguishable from

**G.** DISSÉCTUM, L. More slender and spreading, with narrower lobes to the crowded leaves, and smaller red-purple petals notched at the end; *seeds short-ovoid or globular, finely and deeply pitted.* — Waste grounds, rare. (Nat. from Eu.)

**G.** ROTUNDIFÒLIUM, L. With the habit of the next but the fruit and seed of the last; villous with long white hairs tipped with purple glands; leaves short-lobed. — Rare. (Nat. from Eu.)

**G.** PUSÍLLUM, L. Stems procumbent, slender, minutely pubescent; *leaves rounded kidney-form,* 5 – 7-parted, the divisions wedge-shaped, mostly 3-lobed; *sepals awnless,* about as long as the (purplish) petals; stamens 5; fruit pubescent; *seeds smooth.* — Waste places, Mass. to Penn.; rare. (Nat. from Eu.)

**G.** MÓLLE, L. Like the last; more pubescent; flowers dark purple; stamens 10; carpels transversely wrinkled; seed slightly striate. — Occasionally spontaneous. (Nat. from Eu.)

**G.** COLUMBÌNUM. (LONG-STALKED C.) Minutely hairy, with very slender decumbent stems; leaves 5 – 7-parted and cut into narrow linear lobes; *peduncles and pedicels filiform and elongated;* sepals awned, about equalling the purple petals, enlarging after flowering; *carpels glabrous;* seeds nearly as in G. dissectum. — Rarely introduced; Penn. and southward. June, July. (Nat. from Eu.)

**G.** SIBÍRICUM, L. Slender, repeatedly forked, short-villous; leaves 3-cleft with serrate divisions; flowers dull-white, mostly solitary; sepals awned; seeds minutely reticulate. — Rare. (Nat. from Eu.)

## 2. ERÒDIUM, L'Her. STORKSBILL.

The 5 shorter stamens sterile or wanting. Styles in fruit twisting spirally, bearded inside. Otherwise as Geranium. (Name from ἐρωδιός, *a heron.*)

**E.** CICUTÀRIUM, L'Her. Annual, hairy; stems low, spreading; stipules acute; leaves pinnate, the leaflets sessile, 1 – 2-pinnatifid; peduncles several-flowered. — N. Y., Penn., etc.; scarce. (Adv. from Eu.)

## 3. FLŒ́RKEA, Willd. FALSE MERMAID.

Sepals 3. Petals 3, shorter than the calyx, oblong. Stamens 6. Ovaries 3, opposite the sepals, united only at the base; the style rising in the centre; stigmas 3. Fruit of 3 (or 1 – 2) roughish fleshy achenes. Seed anatropous, erect, filled by the large embryo with its hemispherical fleshy cotyledons. — A small and inconspicuous annual, with minute solitary flowers on axillary peduncles. (Named after *Floerke,* a German botanist.)

1. **F. proserpinacoìdes,** Willd. Leaflets 3 – 5, lanceolate, sometimes 2 – 3-cleft. — Marshes and river-banks, W. New Eng. to Penn., Ky., Wisc., and westward. April – June. Taste slightly pungent.

### 4. ÓXALIS, L. WOOD-SORREL.

Sepals 5, persistent. Petals 5, sometimes united at base, withering after expansion. Stamens 10, usually monadelphous at base, alternately shorter. Styles 5, distinct. Pod oblong, membranaceous, 5-celled, more or less 5-lobed, each cell opening on the back; valves persistent, being fixed to the axis by the partitions. Seeds 2 or more in each cell, pendulous from the axis, anatropous, their outer coat loose and separating. Embryo large and straight in fleshy albumen; cotyledons flat. — Herbs, with sour watery juice, alternate or radical leaves, mostly of 3 obcordate leaflets, which close and droop at nightfall. Several species produce small peculiar flowers, precociously fertilized in the bud and particularly fruitful; and the ordinary flowers are often dimorphous or even trimorphous in the relative length of the stamens and styles. (Name from ὀξύς, *sour*.)

* *Stemless perennials; leaves and scapes arising from a rootstock or bulb; leaflets broadly obcordate; flowers nearly 1′ broad; cells of the pod few-seeded.*

1. **O. Acetosélla**, L. (COMMON WOOD-SORREL.) *Rootstock creeping* and scaly-toothed; *scape 1-flowered* (2–5′ high); petals white with reddish veins, often notched. — Deep cold woods, Mass. to Penn., L. Superior, and northward; also southward in the Alleghanies. June. (Eu.)

2. **O. violàcea**, L. (VIOLET W.) Nearly smooth; *bulb scaly; scapes umbellately several-flowered* (5–9′ high), longer than the leaves; petals violet. — Rocky places and open woods; most common southward. May, June.

* * *Stems leafy, branching; peduncles axillary; flowers yellow; cells several-seeded.*

3. **O. corniculàta**, L. (YELLOW W.) Annual or perennial by running subterranean shoots, erect or procumbent, strigose-pubescent; stipules round or truncate, ciliate; peduncles 2–6-flowered, longer than the leaves; pods elongated, erect in fruit. — Rare; on ballast, etc.; indigenous in Mo. (*Bush*), and southwestward. (Cosmopolitan.)

Var. **stricta**, Sav. Stem erect, somewhat glabrous to very villous; stipules none. (O. stricta, *L.*) — Common. May–Sept. Varies greatly.

4. **O. recúrva**, Ell. Like var. stricta of n. 3; leaflets larger (½–1½′ broad), usually with a brownish margin; flowers larger (6–8″ long). — Penn. to S. Ill., and southward.

### 5. IMPÀTIENS, L. BALSAM. JEWEL-WEED.

Calyx and corolla colored alike and not clearly distinguishable. Sepals apparently only 4; the anterior one notched at the apex and probably consisting of two combined; the posterior one (appearing anterior as the flower hangs on its stalk) largest, and forming a spurred sac. Petals 2, unequal-sided and 2-lobed (each consisting of a pair united). Stamens 5, short; filaments appendaged with a scale on the inner side, the 5 scales connivent and united over the stigma; anthers opening on the inner face. Ovary 5-celled; stigma sessile. Pod with evanescent partitions, and a thick axis bearing several anatropous seeds, 5-valved, the valves coiling elastically and projecting the seeds in bursting. Embryo straight; albumen none. — Leaves simple, alternate, without stipules, in our species ovate or oval, coarsely toothed, petioled. Flowers axillary or panicled, often of two sorts, viz., — the larger ones, which seldom ripen seeds; — and very small ones, which are fertilized early in the bud; their floral envelopes never expand, but are forced off by the growing pod and carried upward on its apex. (Name from the sudden bursting of the pods when touched, whence also the popular appellation, *Touch-me-not*, or *Snap-weed.*)

1. **I. pállida,** Nutt. (Pale Touch-me-not.) *Flowers pale-yellow, sparingly dotted* with brownish-red; sac dilated and very obtuse, broader than long, tipped with a short incurved spur. — Moist shady places and along rills, in rich soil; most common northward. July – Sept. — Larger and greener than the next, with larger flowers, and less frequent.

2. **I. fúlva,** Nutt. (Spotted Touch-me-not.) *Flowers orange-color, thickly spotted with reddish-brown;* sac longer than broad, acutely conical, tapering into a *strongly inflexed spur* half as long as the sac. — Rills and shady moist places; common, especially southward. June – Sept. — Plant 2 – 4° high; the flowers loosely panicled, hanging gracefully on their slender nodding stalks, the open mouth of the cornucopiæ-shaped sepal upward. Spur rarely wanting. Spotless forms of both species occur.

## Order 24. **RUTÀCEÆ.** (Rue Family.)

*Plants with simple or compound leaves, dotted with pellucid glands and abounding with a pungent or bitter-aromatic acrid volatile oil, producing hypogynous almost always regular 3 – 5-merous flowers, the stamens as many or twice as many as the sepals (rarely more numerous); the 2 – 5 pistils separate or combined into a compound ovary of as many cells, raised on a prolongation of the receptacle (gynophore) or glandular disk.* — Embryo large, curved or straight, usually in fleshy albumen. Styles commonly united or cohering, even when the ovaries are distinct. Fruit usually capsular. Leaves alternate or opposite. Stipules none. — A large family, chiefly of the Old World and the southern hemisphere; our two indigenous genera are

1. **Xanthoxylum.** Flowers diœcious; ovaries 3 – 5, separate, forming fleshy pods.
2. **Ptelea.** Flowers polygamous; ovary 2-celled, forming a samara, like that of Elm.

### 1. XANTHÓXYLUM, L. Prickly Ash.

Flowers diœcious. Sepals 4 or 5, obsolete in one species. Petals 4 or 5, imbricated in the bud. Stamens 4 or 5 in the sterile flowers, alternate with the petals. Pistils 2 – 5, separate, but their styles conniving or slightly united. Pods thick and fleshy, 2-valved, 1 – 2-seeded. Seed-coat crustaceous, black, smooth and shining. Embryo straight, with broad cotyledons. — Shrubs or trees, with mostly pinnate leaves, the stems and often the leafstalks prickly. Flowers small, greenish or whitish. (From ξανθός, *yellow*, and ξύλον, *wood.*)

1. **X. Americànum,** Mill. (Northern Prickly Ash. Toothache-tree.) Leaves and flowers in sessile axillary umbellate clusters; leaflets 2 – 4 pairs and an odd one, ovate-oblong, downy when young; calyx none; petals 4 – 5; pistils 3 – 5, with slender styles; pods short-stalked. — Rocky woods and river-banks; common, especially northward. April, May. — A shrub, with

yellowish-green flowers appearing before the leaves. Bark, leaves, and pods very pungent and aromatic.

2. **X. Clàva-Hérculis,** L. (SOUTHERN P.) Glabrous; leaflets 3–8 pairs and an odd one, ovate or ovate-lanceolate, oblique, shining above; flowers in an ample terminal cyme, appearing after the leaves; sepals and petals 5; pistils 2–3, with short styles; pods sessile. (X. Carolinianum, *Lam.*) — Sandy coast of Virginia, and southward. June. — A small tree with very sharp prickles.

## 2. PTÈLEA, L. SHRUBBY TREFOIL. HOP-TREE.

Flowers polygamous. Sepals 3–5. Petals 3–5, imbricated in the bud. Stamens as many. Ovary 2-celled; style short; stigmas 2. Fruit a 2-celled and 2-seeded samara, winged all round, nearly orbicular. — Shrubs, with 3-foliolate leaves, and greenish-white small flowers in compound terminal cymes. (The Greek name of the Elm, here applied to a genus with similar fruit.)

1. **P. trifoliàta,** L. Leaflets ovate, pointed, downy when young. — Rocky places, Long Island to Minn., and southward. June. — A tall shrub. Fruit bitter, used as a substitute for hops. Odor of the flowers disagreeable.

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AILÁNTHUS GLANDULÒSUS, Desf., called TREE OF HEAVEN, — but whose blossoms, especially the staminate ones, are redolent of anything but "airs from heaven," — is much planted as a shade-tree, especially in towns, and is inclined to spread from seed. It belongs to the order SIMARUBACEÆ, which differs from Rutaceæ in the absence of dots in the leaves. The tree is known by its very long pinnate leaves of many leaflets, and small polygamous greenish flowers in panicles, the female producing 2–5 thin, linear-oblong, veiny samaras. (Adv. from China.)

## ORDER 25. ILICÌNEÆ. (HOLLY FAMILY.)

*Trees or shrubs, with small axillary* 4–8-*merous flowers, a minute calyx free from the* 4–8-*celled ovary and the* 4–8-*seeded berry-like drupe; the stamens as many as the divisions of the almost or quite* 4–8-*petalled corolla and alternate with them, attached to their very base.* — Corolla imbricated in the bud. Anthers opening lengthwise. Stigmas 4–8, or united into one, nearly sessile. Seeds suspended and solitary in each cell, anatropous, with a minute embryo in fleshy albumen. Leaves simple, mostly alternate. Flowers white or greenish. — A small family, nearly related to the Gamopetalous order *Ebenaceæ.*

1. **Ilex.** Petals or corolla-lobes oval or obovate. Pedicels mostly clustered.
2. **Nemopanthes.** Petals linear. Pedicels solitary.

## 1. ÌLEX, L. HOLLY.

Flowers more or less diœciously polygamous. Calyx 4–6-toothed. Petals 4–6, separate, or united only at the base, oval or obovate, obtuse, spreading. Stamens 4–6. The berry-like drupe containing 4–6 little nutlets. — Leaves alternate. Fertile flowers inclined to be solitary, and the sterile or partly sterile flowers to be clustered in the axils. (The ancient Latin name of the Holly-Oak, rather than of the Holly.)

§ 1. AQUIFÒLIUM. *Parts of the flower commonly in fours, sometimes in fives or sixes; drupe red, its nutlets ribbed, veiny, or 1-grooved on the back; leaves (mostly smooth) coriaceous and evergreen.*

* *Leaves armed with spiny teeth; trees.*

1. **I. opàca,** Ait. (American Holly.) Leaves oval, flat, the wavy margins with scattered spiny teeth; flowers in loose clusters along the base of the young branches and in the axils; calyx-teeth acute. — Moist woodlands, Maine to N. J., near the coast, west to S. Mo., and southward. June. — Tree 20 – 40° high; the deep green foliage less glossy than in the European Holly (I. Aquifolium, *L.*), the berries not so bright red, and nutlets not so veiny.

* * *Leaves serrate or entire, not spiny; shrubs.*

2. **I. Cassìne,** L. (Cassena. Yaupon.) *Leaves lance-ovate or elliptical, crenate* (1 – 1½′ long); flower-clusters nearly sessile, smooth; *calyx-teeth obtuse.* — Virginia and southward along the coast. May. — Leaves used for tea by the people along the coast, as they were to make the celebrated *black drink* of the North Carolina Indians.

3. **I. Dahòon,** Walt. (Dahoon Holly.) *Leaves oblanceolate or oblong, entire, or sharply serrate* toward the apex, with revolute margins (2 – 3′ long), the *midrib and peduncles pubescent; calyx-teeth acute.* — Swamps, coast of Va. and southward. May, June.

Var. **myrtifòlia,** Chapm. Leaves smaller (1′ long or less) and narrower. (I. myrtifolia, *Walt.*) — Same habitat. May.

§ 2. PRINOÌDES. *Parts of the (polygamous or diœcious) flowers in fours or fives (rarely in sixes); drupe red or purple, the nutlets striate-many-ribbed on the back; leaves deciduous; shrubs.*

4. **I. decídua,** Walt. *Leaves wedge-oblong or lance-obovate, obtusely serrate, downy on the midrib* beneath, shining above, becoming thickish; peduncles of the sterile flowers longer than the petioles, of the fertile short; calyx-teeth smooth, acute. — Wet grounds, Va. to Mo., Kan., and southward. May.

5. **I. montícola,** Gray. *Leaves ovate or lance-oblong, ample* (3 – 5′ long), taper-pointed, thin-membranaceous, *smooth, sharply serrate;* fertile flowers very short-peduncled; calyx ciliate. — Damp woods, Taconic and Catskill Mountains, and Cattaraugus Co., N. Y., through Penn. (east to Northampton Co.), and southward along the Alleghanies. May.

6. **I. móllis,** Gray. *Leaves soft downy beneath,* oval, ovate, or oblong, taper-pointed at both ends, especially at the apex, thin-membranaceous, sharply serrulate; sterile flowers very numerous in umbel-like clusters, the pedicels shorter than the petiole and (with the calyx) soft-downy, the fertile peduncles very short. — Burgoon's Gap, Alleghanies of Penn. (*J. R. Lowrie, Porter*), and along the mountains in the Southern States. — Resembles the last.

§ 3. PRÌNOS. *Parts of the sterile flowers commonly in fours, fives, or sixes, those of the fertile flowers commonly in sixes (rarely in fives, sevens, or eights); nutlets smooth and even; shrubs.*

* *Leaves deciduous; flowers in sessile clusters, or the fertile solitary; fruit bright red.*

7. **I. verticillàta,** Gray. (Black Alder. Winterberry.) *Leaves* oval, obovate, or wedge-lanceolate, pointed, acute at base, serrate, *downy on the veins beneath; flowers all very short-peduncled.* — Low grounds; common. May, June.

8. **I. lævigàta,** Gray. (Smooth Winterberry.) Leaves lanceolate or oblong-lanceolate, pointed at both ends, appressed-serrulate, shining above, beneath mostly *glabrous; sterile flowers long-peduncled.* — Wet grounds, Maine to the mountains of Va. June. — Fruit larger than in the last, ripening earlier in the autumn.

* * *Leaves coriaceous, evergreen and shining, often black-dotted beneath; fruit black.*

9. **I. glàbra,** Gray. (Inkberry.) Leaves wedge-lanceolate or oblong, sparingly toothed toward the apex, smooth; peduncles ($\frac{1}{2}'$ long) of the sterile flowers 3–6-flowered, of the fertile 1-flowered; calyx-teeth rather blunt. — Sandy grounds, Cape Ann, Mass., to Va., and southward near the coast. June. — Shrub 2–3° high.

### 2. NEMOPÁNTHES, Raf. Mountain Holly.

Flowers polygamo-diœcious. Calyx in the sterile flowers of 4–5 minute deciduous teeth, in the fertile ones obsolete. Petals 4–5, oblong-linear, spreading, distinct. Stamens 4-5; filaments slender. Drupe with 4–5 bony nutlets, light red. — A much-branched shrub, with ash-gray bark, alternate and oblong deciduous leaves on slender petioles, entire or slightly toothed, smooth. Flowers on long slender axillary peduncles, solitary or sparingly clustered. (Name said by the author to mean "flower with a filiform peduncle," therefore probably composed of νῆμα, *a thread,* ποῦς, *foot,* and ἄνθος, *flower.*)

1. **N. fasciculàris,** Raf. (N. Canadensis, *DC.*) — Damp cold woods, from the mountains of Va. to Maine, Ind., Wisc., and northward. May.

## Order 26. CELASTRÀCEÆ. (Staff-tree Family.)

*Shrubs with simple leaves, and small regular flowers, the sepals and the petals both imbricated in the bud, the* 4 *or* 5 *perigynous stamens as many as the petals and alternate with them, inserted on a disk which fills the bottom of the calyx and sometimes covers the ovary. Seeds arilled.* — Ovules one or few (erect or pendulous) in each cell, anatropous; styles united into one. Fruit 2–5-celled, free from the calyx. Embryo large, in fleshy albumen; cotyledons broad and thin. Stipules minute and fugacious. Pedicels jointed.

* Leaves alternate. Flowers in terminal racemes.

1. **Celastrus.** A shrubby climber. Fruit globose, orange, 3-valved. Aril scarlet.

* * Leaves opposite. Flowers in axillary cymes or solitary.

2. **Euonymus.** Erect shrubs. Leaves deciduous. Fruit 3–5-lobed, 3–5-valved. Aril red.
3. **Pachystima.** Dwarf evergreen shrub. Flowers very small. Fruit oblong, 2-valved. Aril white.

## 1. CELÁSTRUS, L. Staff-tree. Shrubby Bitter-sweet.

Flowers polygamo-diœcious. Petals (crenulate) and stamens 5, inserted on the margin of a cup-shaped disk which lines the base of the calyx. Pod globose (orange-color and berry-like), 3-celled, 3-valved, loculicidal. Seeds 1 or 2 in each cell, erect, enclosed in a pulpy scarlet aril. — Leaves alternate. Flowers small, greenish, in raceme-like clusters terminating the branches. (An ancient Greek name for some evergreen, which our plant is not.)

1. **C. scándens**, L. (Wax-work. Climbing Bitter-sweet.) Twining shrub; leaves ovate-oblong, finely serrate, pointed. — Along streams and thickets. June. — The opening orange-colored pods, displaying the scarlet covering of the seeds, are very ornamental in autumn.

## 2. EUÓNYMUS, Tourn. Spindle-tree.

Flowers perfect. Sepals 4 or 5, united at the base, forming a short and flat calyx. Petals 4 – 5, rounded, spreading. Stamens very short, inserted on the edge or face of a broad and flat 4 – 5-angled disk, which coheres with the calyx and is stretched over the ovary, adhering to it more or less. Style short or none. Pod 3 – 5-lobed, 3 – 5-valved, loculicidal. Seeds 1 – 4 in each cell, enclosed in a red aril. — Shrubs, with 4-sided branchlets, opposite serrate leaves, and loose cymes of small flowers on axillary peduncles. (Derivation from εὖ, *good*, and ὄνομα, *name*, because it has the bad reputation of poisoning cattle. *Tourn.*)

1. **E. atropurpùreus**, Jacq. (Burning-Bush. Waahoo.) Shrub tall (6 – 14° high) and upright; *leaves petioled*, oval-oblong, pointed; parts of the (dark-purple) flower commonly in fours; *pods smooth, deeply lobed*. — N. Y. to Wisc., Neb., and southward; also cultivated. June. — Ornamental in autumn, by its copious crimson fruit, drooping on long peduncles.

2. **E. Americànus**, L. (Strawberry Bush.) Shrub low, upright or straggling (2 – 5° high); *leaves almost sessile, thickish*, bright green, varying from ovate to oblong-lanceolate, acute or pointed; parts of the greenish-purple flowers mostly in fives; *pods rough-warty, depressed*, crimson when ripe; the aril and dissepiments scarlet. — Wooded river-banks, N. Y. to Ill., and southward. June.

Var. **obovàtus**, Torr. & Gray. Trailing, with rooting branches; flowering stems 1 – 2° high; leaves thin and dull, obovate or oblong. — Low or wet places; the commoner form.

## 3. PACHÝSTIMA, Raf.

Flowers perfect. Sepals and petals 4. Stamens 4, on the edge of the broad disk lining the calyx-tube. Ovary free; style very short. Pod small, oblong, 2-celled, loculicidally 2-valved. Seeds 1 or 2, enclosed in a white membranaceous many-cleft aril. — Low evergreen shrubs, with smooth serrulate coriaceous opposite leaves and very small green flowers solitary or fascicled in the axils. (Derivation obscure.)

1. **P. Cánbyi**, Gray. Leaves linear to linear-oblong or oblong-obovate, obtuse, 3″ – 1′ long; pedicels very slender, often solitary, shorter than the leaves; fruit 2″ long. — Mountains of S. W. Va.

## ORDER 27. RHAMNÀCEÆ. (BUCKTHORN FAMILY.)

*Shrubs or small trees, with simple leaves, small and regular flowers (sometimes apetalous), with the 4 or 5 perigynous stamens as many as the valvate sepals and alternate with them, accordingly opposite the petals! Drupe or pod with only one erect seed in each cell, not arilled.* — Petals folded inwards in the bud, hooded or concave, inserted along with the stamens into the edge of the fleshy disk which lines the short tube of the calyx and sometimes unites it to the lower part of the 2–5-celled ovary. Ovules solitary, anatropous. Stigmas 2–5. Embryo large, with broad cotyledons, in sparing fleshy albumen. — Flowers often polygamous, sometimes diœcious. Leaves mostly alternate; stipules small or obsolete. Branches often thorny. (Slightly bitter and astringent; the fruit often mucilaginous, commonly rather nauseous or drastic.)

* Calyx and disk free from the ovary.

1. **Berchemia.** Petals sessile, entire, as long as the calyx. Drupe with thin flesh and a 2-celled bony putamen.
2. **Rhamnus.** Petals small, short-clawed, notched, or none. Drupe berry-like, with 2–4 separate seed-like nutlets.

* * Calyx with the disk adherent to the base of the ovary.

3. **Ceanothus.** Petals long-clawed, hooded. Fruit dry, at length dehiscent.

### 1. BERCHÈMIA, Necker. SUPPLE-JACK.

Calyx with a very short and roundish tube; its lobes equalling the 5 oblong sessile acute petals, longer than the stamens. Disk very thick and flat, filling the calyx-tube and covering the ovary. Drupe oblong, with thin flesh and a bony 2-celled putamen. — Woody high-climbing twiners, with the pinnate veins of the leaves straight and parallel, the small greenish-white flowers in small panicles. (Name unexplained, probably personal.)

1. **B. volùbilis,** DC. Glabrous; leaves oblong-ovate, acute, scarcely serrulate; style short. — Damp soils, Va. to Ky. and Mo., and southward. June. — Ascending tall trees. Stems tough and very lithe, whence the popular name.

### 2. RHÁMNUS, Tourn. BUCKTHORN.

Calyx 4–5-cleft; the tube campanulate, lined with the disk. Petals small, short-clawed, notched at the end, wrapped around the short stamens, or sometimes none. Ovary free, 2–4-celled. Drupe berry-like (black), containing 2–4 separate seed-like nutlets, of cartilaginous texture. — Shrubs or small trees, with loosely pinnately veined leaves, and greenish polygamous or diœcious flowers, in axillary clusters. (The ancient Greek name.)

§ 1. RHAMNUS proper. *Flowers usually diœcious; nutlets and seeds deeply grooved on the back; rhaphe dorsal; cotyledons foliaceous, the margins revolute.*

* *Calyx-lobes and stamens 5; petals wanting.*

1. **R. alnifòlia,** L'Her. A low shrub; leaves oval, acute, serrate, nearly straight-veined; fruit 3-seeded. — Swamps, Maine to Penn., Neb., and northward. June.

* * *Calyx-lobes, petals, and stamens* 4.

**R.** CATHÁRTICA, L. (COMMON BUCKTHORN.) *Leaves ovate*, minutely serrate; *fruit* 3–4-*seeded;* branchlets thorny. — Cultivated for hedges; sparingly naturalized eastward. May, June. (Nat. from Eu.)

2. **R. lanceolàta,** Pursh. *Leaves oblong-lanceolate* and acute, or on flowering shoots oblong and obtuse, finely serrulate, smooth or minutely downy beneath; petals deeply notched; *fruit* 2-*seeded.* — Hills and river-banks, Penn. (Mercersburg, *Green*) to Ill., Tenn., and westward. May. — Shrub tall, not thorny; the yellowish-green flowers of two forms on distinct plants, both perfect; one with short pedicels clustered in the axils and with a short included style; the other with pedicels oftener solitary, the style longer and exserted.

§ 2. FRÁNGULA. *Flowers perfect; nutlets and seeds not furrowed; cotyledons flat, thick; rhaphe lateral.*

3. **R. Caroliniàna,** Walt. Thornless shrub or small tree; leaves (3–5′ long) oblong, obscurely serrulate, nearly glabrous, deciduous; flowers 5-merous, in one form umbelled, in another solitary in the axils, short-peduncled; drupe globose, 3-seeded. (Frangula Caroliniana, *Gray.*) — Swamps and river-banks, N. J., Va. to Ky., and southward. June.

### 3. CEANÒTHUS, L. NEW JERSEY TEA. RED-ROOT.

Calyx 5-lobed, incurved; the lower part cohering with the thick disk to the ovary, the upper separating across in fruit. Petals hooded, spreading, on slender claws longer than the calyx. Filaments elongated. Fruit 3-lobed, dry and splitting into its 3 carpels when ripe. Seed as in § Frangula. — Shrubby plants; flowers in little umbel-like clusters, forming dense panicles or corymbs at the summit of naked flower-branches; calyx and pedicels colored like the petals. (An obscure name in Theophrastus, probably misspelled.)

1. **C. Americànus,** L. (NEW JERSEY TEA.) Leaves ovate or oblong-ovate, 3-ribbed, serrate, more or less pubescent, often slightly heart-shaped at base; common peduncles elongated. — Dry woodlands. July. — Stems 1–3° high from a dark red root; branches downy. Flowers in pretty white clusters, on leafy shoots of the same year. The leaves were used for tea during the American Revolution.

2. **C. ovàtus,** Desf. Leaves narrowly oval or elliptical-lanceolate, finely glandular-serrate, glabrous or nearly so, as well as the short common peduncles. (C. ovalis, *Bigel.*) — Dry rocks, W. Vt. and Mass. to Minn., Ill., and southwestward; rare eastward. May.

## ORDER 28. VITÀCEÆ. (VINE FAMILY.)

*Shrubs with watery juice, usually climbing by tendrils, with small regular flowers, a minute or truncated calyx, its limb mostly obsolete, and the stamens as many as the valvate petals and opposite them! Berry 2-celled, usually 4-seeded.* — Petals 4–5, very deciduous, hypogynous or perigynous. Filaments slender; anthers introrse. Pistil with a short style or none, and a slightly 2-lobed stigma; ovary 2-celled, with 2 erect anatropous ovules from the base of each cell. Seeds bony, with a minute embryo at the base of the hard albumen, which is grooved on one side. — Stipules deciduous. Leaves alternate, palmately veined or compound; tendrils and flower-clusters opposite the leaves. Flowers small, greenish, commonly polygamous. (Young shoots, foliage, etc., acid.)

* Ovary surrounded by a nectariferous or glanduliferous disk; plants climbing by the coiling of naked-tipped tendrils.

1. **Vitis.** Corolla caducous without expanding. Hypogynous glands 5, alternate with the stamens. Fruit pulpy Leaves simple.
2. **Cissus.** Corolla expanding. Disk cupular. Berry with scanty pulp, inedible. Leaves simple or pinnately compound.

* * No distinct hypogynous disk; plants climbing by the adhesion of the dilated tips of the tendril-branches.

3. **Ampelopsis.** Corolla expanding. Leaves digitate.

### 1. VÌTIS, Tourn. Grape.

Flowers polygamo-diœcious (some plants with perfect flowers, others staminate with at most a rudimentary ovary), 5-merous. Calyx very short, usually with a nearly entire border or none at all. Petals separating only at base and falling off without expanding. Hypogynous disk of 5 nectariferous glands alternate with the stamens. Berry pulpy. Seeds pyriform, with beak-like base. — Plants climbing by the coiling of naked-tipped tendrils. Flowers in a compound thyrse, very fragrant; pedicels mostly umbellate-clustered. Leaves simple, rounded and heart-shaped. (The classical Latin name.)

§ 1. VITIS proper. *Bark loose and shreddy; tendrils forked; nodes solid.*

+ *A tendril (or inflorescence) opposite each leaf.*

1. **V. Labrúsca,** L. (Northern Fox-Grape.) Branchlets and young leaves very woolly; leaves large, entire or deeply lobed, slightly dentate, continuing rusty-woolly beneath; fertile panicles compact; berries large. — Moist thickets, N. Eng. to the Alleghany Mountains, and south to S. Car. June. Fruit ripe in Sept. or Oct., dark purple or amber-color, with a tough musky pulp. Improved by cultivation, it has given rise to the Isabella, Catawba, Concord and other varieties.

+ + *Tendrils intermittent (none opposite each third leaf).*

++ *Leaves pubescent and floccose, especially beneath and when young.*

2. **V. æstivàlis,** Michx. (Summer Grape.) Branchlets terete; leaves large, entire or more or less deeply and obtusely 3–5-lobed, with short broad teeth, very woolly and mostly red or rusty when young; berries middle-sized, black with a bloom, in compact bunches. — Thickets; common. May, June. Berries pleasant, ripe in Sept. — V. bicolor, LeConte, has its leaves smoothish when old and pale or glaucous beneath; common north and westward.

3. **V. cinèrea,** Engelm. (Downy Grape.) Branchlets angular; pubescence whitish or grayish, persistent; leaves entire or slightly 3-lobed; inflorescence large and loose; berries small, black without bloom. — Central Ill. to Kan. and Tex.

++ ++ *Leaves glabrous and mostly shining, or short-hairy especially on the ribs beneath, incisely lobed or undivided*

4. **V. cordifòlia,** Michx. (Frost or Chicken Grape.) Leaves 3–4′ wide, not lobed or slightly 3-lobed, cordate with a deep acute sinus, acuminate,

coarsely and sharply toothed; stipules small; inflorescence ample, loose; berries small, black and shining, very acerb, ripening after frosts; seeds 1 or 2, rather large, with a prominent rhaphe. — Thickets and stream-banks, New Eng. to central Ill., Mo., Neb., and southward. May, June.

5. **V. ripària,** Michx. Differing from the last in the larger and more persistent stipules (2 - 3″ long), more shining and more usually 3-lobed leaves with a broad rounded or truncate sinus and large acute or acuminate teeth, smaller compact inflorescence, and berries (4 - 5″ broad) with a bloom, sweet and very juicy, ripening from July to Sept.; seeds very small; rhaphe indistinct. (V. cordifolia, var. riparia, *Gray.*) — Stream-banks or near water, W. New Eng. to Penn., west to Minn. and Kan. Eastward the berries are sour and ripen late.

6. **V. palmàta,** Vahl. Branches bright red; leaves dark green and dull, 3 - 5-lobed, with a broad sinus, the lobes usually long-acuminate; inflorescence large and loose; berries black, without bloom, ripening late; seeds very large and rounded; otherwise like n. 5. (V. rubra, *Michx.*) — Ill. and Mo.

7. **V. rupéstris,** Scheele. (SAND OR SUGAR GRAPE.) Usually low and bushy, often without tendrils; leaves rather small, shining, broadly cordate, abruptly pointed, with broad coarse teeth, rarely slightly lobed; berries rather small, sweet, in very small close bunches, ripe in Aug. — Mo. to Tex.; also found in Tenn., and reported from banks of the Potomac, near Washington.

§ 2. MUSCADÍNIA. *Bark closely adherent on the branches; pith continuous through the nodes; tendrils simple, intermittent; seeds with transverse wrinkles on both sides.*

8. **V. rotundifòlia,** Michx. (MUSCADINE, BULLACE, OR SOUTHERN FOX-GRAPE.) Leaves shining both sides, small, rounded with a heart-shaped base, very coarsely toothed with broad and bluntish teeth, seldom lobed; panicles small, densely flowered; berries large (½ - ¾′ in diameter), musky, purplish without a bloom, with a thick and tough skin, ripe early in autumn. (V. vulpina, *Man.*, not *L.?*) — River-banks, Md. to Ky., Mo., Kan., and southward. May — Branchlets minutely warty. This is the original of the Scuppernong Grape, etc.

## 2. CÍSSUS, L.

Flowers perfect or sometimes polygamous, 4-merous or (in ours) 5-merous. Petals expanding. Disk cup-shaped, surrounding the base of the ovary. Berry inedible, with scanty pulp. Seeds usually triangular-obovate. — Tendrils in our species few and mostly in the inflorescence. A vast genus, mainly tropical. (Greek name of the Ivy.)

1. **C. Ampelópsis,** Pers. Nearly glabrous; *leaves heart-shaped* or truncate at the base, coarsely and sharply toothed, acuminate, not lobed; panicle small and loose; style slender; berries of the size of a pea, 1 - 3-seeded, bluish or greenish. (Vitis indivisa, *Willd.*) — River-banks, Va. to Ill., and southward. June.

2. **C. stans,** Pers. Nearly glabrous, bushy and rather upright; *leaves twice pinnate or ternate,* the leaflets cut-toothed; flowers cymose; calyx 5-toothed; disk very thick, adherent to the ovary; berries black, obovate. (Vitis bipinnata, *Torr. & Gray.*) — Rich soils, Va. to Mo., and southward.

### 3. AMPELÓPSIS, Michx. VIRGINIAN CREEPER.

Calyx slightly 5-toothed. Petals concave, thick, expanding before they fall. Disk none. — Leaves digitate, with 5 (3 – 7) oblong-lanceolate sparingly serrate leaflets. Flower-clusters cymose. Tendrils fixing themselves to trunks or walls by dilated sucker-like disks at their tips. (Name from ἄμπελος, *a vine*, and ὄψις, *appearance*.)

1. **A. quinquefòlia,** Michx. A common woody vine, in low or rich grounds, climbing extensively, sometimes by rootlets as well as by its disk-bearing tendrils, blossoming in July, ripening its small blackish berries in October. Also called *American Ivy*, and still less appropriately, *Woodbine*. Leaves turning bright crimson in autumn.

## ORDER 29. SAPINDÀCEÆ. (SOAPBERRY FAMILY.)

*Trees or shrubs, with simple or compound leaves, mostly unsymmetrical and often irregular flowers; the* 4 – 5 *sepals and petals imbricated in æstivation; the* 5 – 10 *stamens inserted on a fleshy* (*perigynous or hypogynous*) *disk; a* 2 – 3-*celled and -lobed ovary, with* 1 – 2 (*rarely more*) *ovules in each cell; and the embryo* (except Staphylea) *curved or convolute, without albumen.* — A large and diverse order.

SUBORDER I. **Sapindeæ.** Flowers (often polygamous) mostly unsymmetrical and irregular. Stamens commonly more numerous than the petals, rarely twice as many. Ovules 1 or 2 in each cell. Embryo curved or convolute, rarely straight; cotyledons thick and fleshy. — Leaves alternate or sometimes opposite, without stipules, mostly compound.

1. **Æsculus.** Flowers irregular. Calyx 5-lobed. Petals 4 or 5. Stamens commonly 7. Fruit a leathery 3-valved pod Leaves opposite, digitate.
2. **Sapindus.** Flowers regular. Sepals 4 – 5, in two rows. Petals 4 - 5. Stamens 8 - 10. Fruit a globose or 2 - 3-lobed berry Leaves alternate, pinnate.

SUBORDER II. **Acerineæ.** (MAPLE FAMILY.) Flowers (polygamous or diœcious) small, regular, but usually unsymmetrical. Petals often wanting. Ovary 2-lobed and 2-celled, with a pair of ovules in each cell. Fruits winged, 1-seeded. Embryo coiled or folded; the cotyledons long and thin. — Leaves opposite, simple or compound.

3. **Acer.** Flowers polygamous. Leaves simple.
4. **Negundo.** Flowers diœcious. Leaves pinnate, with 3 - 5 leaflets.

SUBORDER III. **Staphyleæ.** (BLADDER-NUT FAMILY.) Flowers (perfect) regular; stamens as many as the petals. Ovules 1 – 8 in each cell. Seeds bony, with a straight embryo in scanty albumen. — Shrubs with opposite pinnately compound leaves, both stipulate and stipellate.

5. **Staphylea.** Lobes of the colored calyx and petals 5, erect. Stamens 5. Fruit a 3-celled bladdery-inflated pod.

### 1. ǼSCULUS, L. HORSE-CHESTNUT. BUCKEYE.

Calyx tubular, 5-lobed, often oblique or gibbous at base. Petals 4 – 5, more or less unequal, with claws, nearly hypogynous. Stamens 7 (rarely 6 or 8);

filaments long, slender, often unequal. Style 1; ovary 3-celled, with 2 ovules in each cell. Fruit a leathery pod, 3-celled and 3-seeded, or usually by abortion 1-celled and 1-seeded, loculicidally 3-valved. Seed very large, with thick shining coat, and a large round pale scar. Cotyledons very thick and fleshy, their contiguous faces coherent, remaining under ground in germination; plumule 2-leaved; radicle curved. — Trees or shrubs. Leaves opposite, digitate; leaflets serrate, straight-veined, like a Chestnut-leaf. Flowers in a terminal thyrse or dense panicle, often polygamous, most of them with imperfect pistils and sterile; pedicels jointed. Seeds farinaceous, but imbued with a bitter and narcotic principle. (The ancient name of some Oak or other mast-bearing tree.)

§ 1. ÆSCULUS proper. *Fruit covered with prickles when young.*

**Æ.** Hippocàstanum, L. (Common Horse-chestnut.) Corolla spreading, white spotted with purple and yellow, of 5 petals; stamens declined; leaflets 7. — Commonly planted. (Adv. from Asia via Eu.)

1. **Æ. glàbra,** Willd. (Fetid or Ohio Buckeye.) Stamens curved, longer than the pale yellow corolla of 4 upright petals; leaflets usually 5. — River-banks, W. Penn. to Mich., Mo., Kan., and southward. June. — A large tree; the bark exhaling an unpleasant odor, as in the rest of the genus. Flowers small, not showy.

§ 2. PÀVIA. *Fruit smooth; petals 4, conniving; the 2 upper smaller and longer than the others, with a small rounded blade on a very long claw.*

2. **Æ. flàva,** Ait. (Sweet Buckeye.) *Stamens included* in the yellow corolla; *calyx oblong-campanulate;* leaflets 5, sometimes 7, glabrous, or often minutely downy underneath. — Rich woods, Va. to Ohio, Mo., and southward. May. A large tree or a shrub.

Var. **purpuráscens,** Gray. Calyx and corolla tinged with flesh-color or dull purple; leaflets commonly downy beneath. — From W. Va., south and westward.

3. **Æ. Pàvia,** L. (Red Buckeye.) Stamens not longer than the corolla, which is bright red, as well as the *tubular calyx;* leaflets glabrous or soft-downy beneath. — Fertile valleys, Va., Ky., Mo., and southward. May. A shrub or small tree.

### 2. SAPÌNDUS, L. Soap-berry.

Flowers regular, polygamous. Sepals 4–5, imbricated in 2 rows. Petals 4–5, with a scale at the base. Stamens 8–10, upon the hypogynous disk. Ovary 3-celled, with an ascending ovule in each cell. Fruit a globose or 2–3-lobed berry, 1–3-seeded. Seed crustaceous, globose. — Trees or shrubs, with alternate abruptly pinnate leaves, and small flowers in terminal or axillary racemes or panicles. (Name a contraction of *Sapo Indicus, Indian soap,* having reference to the saponaceous character of the berries.)

1. **S. acuminàtus,** Raf. A tree 20–60° high; leaflets 4–9 pairs, obliquely lanceolate, sharply acuminate, entire, $1\frac{1}{2}$–3′ long; the rhachis of the leaf not winged; flowers white, in a large panicle; fruit mostly globose, 6″ broad. (S. marginatus of authors, not *Willd.*) — S. Kan. to La., Fla., and Mex.

### 3. ACER, Tourn. MAPLE.

Flowers polygamo-diœcious. Calyx colored, 5- (rarely 4–12-) lobed or parted. Petals either none or as many as the lobes of the calyx, equal, with short claws if any, inserted on the margin of the lobed disk, which is either perigynous or hypogynous. Stamens 3–12. Ovary 2-celled, with a pair of ovules in each cell; styles 2, long and slender, united only below, stigmatic down the inside. From the back of each carpel grows a wing, converting the fruit into two 1-seeded, at length separable samaras or keys. Embryo variously coiled or folded, with large and thin cotyledons. — Trees, or sometimes shrubs, with opposite palmately-lobed leaves, and small flowers. Pedicels not jointed. (The classical name, from the Celtic *ac*, hard.)

* *Flowers in terminal racemes, greenish, appearing after the leaves; stamens* 6–8.

1. **A. Pennsylvánicum**, L. (STRIPED MAPLE.) Leaves 3-lobed at the apex, finely and sharply doubly serrate, the short lobes taper-pointed and also serrate; *racemes drooping, loose; petals obovate;* fruit with large diverging wings. — Rich woods, Maine to Minn., and southward to Va., Ky., and Mo. June. — A small and slender tree, with light-green bark striped with dark lines, and greenish flowers and fruit. Also called *Striped Dogwood* and *Moose-Wood.*

2. **A. spicàtum**, Lam. (MOUNTAIN M.) Leaves downy beneath, 3- (or slightly 5-) lobed, coarsely serrate, the lobes taper-pointed; *racemes upright, dense,* somewhat compound; *petals linear-spatulate;* fruit with small erect or divergent wings. — Moist woods, with the same range as n. 1. June. — A tall shrub, forming clumps.

* * *Flowers in nearly sessile terminal and lateral umbellate-corymbs, greenish-yellow, appearing with the leaves.*

3. **A. saccharìnum**, Wang. (SUGAR or ROCK M.) Leaves 3–5-lobed, with rounded sinuses and pointed sparingly sinuate-toothed lobes, either heart-shaped or nearly truncate at the base, whitish and smooth or a little downy on the veins beneath; flowers from terminal leaf-bearing and lateral leafless buds, drooping on very slender hairy pedicels; calyx hairy at the apex; petals none; wings of the fruit broad, usually slightly diverging. — Rich woods, especially northward and along the mountains southward. April, May. — A large and handsome tree.

Var. **nìgrum**, Torr. & Gray. (BLACK SUGAR-M.) Leaves scarcely paler beneath, but often minutely downy, the lobes wider, often shorter and entire, the sinus at the base often closed. — With the ordinary form; quite variable, sometimes appearing distinct.

* * * *Flowers in umbel-like clusters arising from separate lateral buds, and much preceding the leaves; stamens* 3–6.

4. **A. dasycárpum**, Ehrh. (WHITE or SILVER M.) *Leaves very deeply 5-lobed* with the sinuses rather acute, silvery-white (and when young downy) underneath, the divisions narrow, cut-lobed and toothed; flowers (greenish-yellow) on short pedicels; *petals none; fruit woolly when young,* with large divergent wings. — River-banks; most common southward and westward. March–April. — A fine ornamental tree.

5. **A. rùbrum,** L. (Red or Swamp M.) *Leaves* 3–5 *lobed*, with acute sinuses, whitish underneath; the lobes irregularly serrate and notched, acute, the middle one usually longest; *petals linear-oblong;* flowers (scarlet, crimson, or sometimes yellowish) on very short pedicels; but the *smooth fruit* on prolonged drooping pedicels. — Swamps and wet woods. April. — A small tree, with reddish twigs; the leaves varying greatly in shape, turning bright crimson in early autumn.

### 4. NEGÚNDO, Moench. Ash-leaved Maple. Box-Elder.

Flowers diœcious. Calyx minute, 4–5-cleft. Petals none. Stamens 4–5. Disk none. — Sterile flowers in clusters on capillary pedicels, the fertile in drooping racemes, from lateral buds. Leaves pinnate, with 3 or 5 leaflets. Fruit as in Acer. (Name unmeaning.)

1. **N. aceroìdes,** Moench. Leaflets smoothish when old, very veiny, ovate, pointed, toothed; fruit smooth, with large rather incurved wings. — River-banks, W. New Eng. to Dak., south and westward. April. — A small but handsome tree, with light-green twigs, and very delicate drooping clusters of small greenish flowers, rather earlier than the leaves.

### 5. STAPHYLÈA, L. Bladder-Nut.

Calyx deeply 5-parted, the lobes erect, whitish. Petals 5, erect, spatulate, inserted on the margin of the thick perigynous disk which lines the base of the calyx. Stamens 5, alternate with the petals. Pistil of 3 several-ovuled carpels, united in the axis, their long styles lightly cohering. Pod large, membranaceous, inflated, 3-lobed, 3-celled, at length bursting at the summit; the cells containing 1–4 bony anatropous seeds. Aril none. Embryo large and straight, in scanty albumen, cotyledons broad and thin. — Upright shrubs, with opposite pinnate leaves of 3 or 5 serrate leaflets, and white flowers in drooping raceme-like clusters, terminating the branchlets. Stipules and stipels deciduous. (Name from *σταφυλή, a cluster.*)

1. **S. trifòlia,** L. (American Bladder-nut.) Leaflets 3, ovate, pointed. — Thickets, in moist soil. May. — Shrub 10° high, with greenish striped branches.

## Order 30. ANACARDIÀCEÆ. (Cashew Family.)

*Trees or shrubs, with resinous or milky acrid juice, dotless alternate leaves, and small, often polygamous, regular, 5-merous flowers, but the ovary 1-celled and 1-ovuled, with 3 styles or stigmas.* — Petals imbricated in the bud. Fruit mostly drupaceous. Seed without albumen, borne on a curved stalk that rises from the base of the cell. Stipules none. Juice or exhalations often poisonous.

### 1. RHÚS, L. Sumach.

Calyx small, 5-parted. Petals 5. Stamens 5, inserted under the edge or between the lobes of a flattened disk in the bottom of the calyx. Fruit small and indehiscent, a sort of dry drupe. — Leaves usually compound. Flowers greenish-white or yellowish. (The old Greek and Latin name.)

§ 1. RHUS proper. *Fruit symmetrical, with the styles terminal.*

* *Flowers polygamous, in a terminal thyrsoid panicle; fruit globular, clothed with acid crimson hairs; stone smooth; leaves odd-pinnate.* (*Not poisonous.*) — (§ Sumac, DC.)

1. **R. týphina,** L. (Staghorn Sumach.) *Branches and stalks densely velvety-hairy;* leaflets 11 – 31, pale beneath, oblong-lanceolate, pointed, serrate, rarely laciniate. — Hillsides. June. — Shrub or tree 10 – 30° high, with orange-colored wood. Apparently hybridizes with the next.

2. **R. glàbra,** L. (Smooth S.) *Smooth, somewhat glaucous;* leaflets 11 – 31, whitened beneath, lanceolate-oblong, pointed, serrate. — Rocky or barren soil. June, July. — Shrub 2 – 12° high. A var. has laciniate leaflets.

3. **R. copallina,** L. (Dwarf S.) *Branches and stalks downy; petioles wing-margined* between the 9 – 21 oblong or ovate-lanceolate (often entire) leaflets, which are oblique or unequal at the base, smooth and shining above. — Rocky hills. July. — Shrub 1 – 7° high, with running roots.

* * *Flowers polygamous, in loose and slender axillary panicles; fruit globular, glabrous, whitish or dun-colored; the stone striate; leaves odd-pinnate or 3-foliolate, thin.* (*Poisonous.*) — (§ Toxicodendron, DC.)

4. **R. venenàta,** DC. (Poison S. or Dogwood.) Smooth, or nearly so; *leaflets* 7 – 13, *obovate-oblong,* entire. — Swamps. June. — Shrub 6 – 18° high. The most poisonous species; also called *Poison Elder.*

5. **R. Toxicodéndron,** L. (Poison Ivy. Poison Oak.) Climbing by rootlets over rocks, etc., or ascending trees, or sometimes low and erect; *leaflets* 3, *rhombic-ovate,* mostly pointed, and rather downy beneath, variously notched, sinuate, or cut-lobed, — high-climbing plants (R. radicans, *L.*) having usually more entire leaves. — Thickets, low grounds, etc. June.

* * * *Flowers polygamo-diœcious, in small solitary or clustered spikes or heads which develop in spring before the leaves; leaves 3-foliolate; fruit as in first group.* (*Not poisonous*). — (§ Lobadium, Torr. & Gray.)

6. **R. Canadénsis,** Marsh. Leaves soft-pubescent when young, becoming glabrate; leaflets rhombic-obovate or ovate, unequally cut-toothed, 1 – 3′ long, the terminal one cuneate at base and sometimes 3-cleft; flowers pale yellow. (R. aromatica, *Ait.*) — Dry rocky banks, W. Vt. to Minn., and southward. — A straggling bush, 3 – 7° high; the crushed leaves not unpleasantly scented.

Var. **trilobàta,** Gray. With smaller leaflets (½ – 1′ long), crenately few-lobed or incised toward the summit. — Long Pine, Neb., and common westward. Unpleasantly scented.

§ 2. CÒTINUS. *Ovary becoming very gibbous in fruit, with the remains of the styles lateral; flowers in loose ample panicles, the pedicels elongating and becoming plumose; leaves simple, entire.*

7. **R. cotinoìdes,** Nutt. Glabrous or nearly so; leaves thin, oval, 3 – 6′ long; flowers and fruit as in the cultivated *Smoke-tree* (R. Cotinus). — Mo. to Tenn., and southward. — A tree, 25 – 40° high.

## ORDER 31. POLYGALÀCEÆ. (MILKWORT FAMILY.)

*Plants with irregular hypogynous flowers*, 4 – 8 *diadelphous or monadelphous stamens, their* 1-*celled anthers opening at the top by a pore or chink; the fruit a* 2-*celled and* 2-*seeded pod.*

### 1. POLÝGALA, Tourn. MILKWORT.

Flower very irregular. Calyx persistent, of 5 sepals, of which 3 (the upper and the 2 lower) are small and often greenish, while the two lateral or inner (called *wings*) are much larger, and colored like the petals. Petals 3, hypogynous, connected with each other and with the stamen-tube, the middle (lower) one keel-shaped and often crested on the back. Stamens 6 or 8; their filaments united below into a split sheath, or into 2 sets, cohering more or less with the petals, free above; anthers 1-celled, often cup-shaped, opening by a hole or broad chink at the apex. Ovary 2-celled, with a single anatropous ovule pendulous in each cell; style prolonged and curved; stigma various. Fruit a small, loculicidal 2-seeded pod, usually rounded and notched at the apex, much flattened contrary to the very narrow partition. Seeds carunculate. Embryo large, straight, with flat and broad cotyledons, in scanty albumen. — Bitter plants (low herbs in temperate regions), with simple entire often dotted leaves, and no stipules; sometimes (as in the first two species) bearing cleistogamous flowers next the ground. (An old name composed of **πολύς**, *much*, and *γάλα*, *milk*, from a fancied property of its increasing this secretion.)

∗ *Perennial or biennial; flowers purple or white; leaves alternate.*

+ *Flowers showy, rose-purple, conspicuously crested; also bearing inconspicuous colorless cleistogamous flowers on subterranean branches.*

1. **P. paucifòlia,** Willd. *Perennial;* flowering stems short (3 – 4′ high), from long slender prostrate or subterranean shoots, which also bear concealed fertile flowers; lower leaves small and scale-like, scattered, the *upper ovate, petioled, crowded* at the summit; *flowers* 1 – 3, *large,* peduncled; wings obovate, rather shorter than the fringe-crested keel; stamens 6; caruncle of 2 or 3 awl-shaped lobes longer than the seed. — Woods, in light soil, N. Eng. to Minn., Ill., and southward along the Alleghanies. May. — A delicate plant, with very handsome flowers, 9″ long, rose-purple, or rarely pure white. Sometimes called *Flowering Wintergreen*, but more appropriately FRINGED POLYGALA.

2. **P. polýgama,** Walt. Stems numerous from the *biennial* root, mostly simple, ascending, very leafy (6 – 9′ high); *leaves oblanceolate or oblong:* terminal *raceme loosely many-flowered,* the broadly obovate wings longer than the keel; stamens 8; radical flowers racemed on short subterranean runners; lobes of the caruncle 2, scale-like, shorter than the seed. — Dry sandy soil; common. July.

+ + *Flowers white, in a solitary close spike; none cleistogamous.*

3. **P. Sénega,** L. (SENECA SNAKEROOT.) Stems several from thick and hard knotty rootstocks, simple (6 – 12′ high); leaves lanceolate or oblong-lanceolate, with rough margins; wings round-obovate, concave; crest short; caruncle nearly as long as the seed. — Rocky soil, W. New Eng. to Minn., and southward. May, June.

Var. **latifòlia,** Torr. & Gray. Taller, sometimes branched; leaves ovate or ovate-lanceolate, 2 – 4′ long, tapering to each end. — Md. to Mich. and Ky.

4. **P. álba,** Nutt. Stems several from a hard rootstock, 1° high; leaves narrowly linear, 3 – 12″ long, acute; wings oblong-obovate; crest small; lobes of the caruncle half the length of the appressed-silky seed. — Neb. and Kan. to Tex.

* * *Annuals, with all the leaves alternate; flowers in terminal spikes, heads or racemes, purple or rose-color, in summer; none subterranean.*

+- *Keel conspicuously crested; claws of the true petals united into a long and slender cleft tube much surpassing the wings.*

5. **P. incarnàta,** L. Glaucous; stem slender, sparingly branched; leaves minute and linear-awl-shaped; spike cylindrical; flowers flesh-color; caruncle longer than the narrow stalk of the hairy seed. — Dry soil, Penn. to Wisc., Iowa, Neb., and southward; rather rare.

+- +- *Keel minutely or inconspicuously crested; the true petals not longer but mostly shorter than the wings; seed pear-shaped.*

6. **P. sanguìnea,** L. Stem sparingly branched above, leafy to the top; *leaves oblong-linear; heads globular, at length oblong,* very dense (4 – 5″ thick), bright red-purple (rarely paler or even white); pedicels scarcely any; *wings broadly ovate, closely sessile,* longer than the pod; the 2-parted *caruncle almost equalling the seed.* — Sandy and moist ground; common.

7. **P. fastigiàta,** Nutt. Stem slender, at length corymbosely branched; *leaves narrowly linear,* acute, 3 – 8″ long; *spikes short and dense* (3″ in diameter); the small rose-purple flowers on *pedicels of about the length of the pod;* wings obovate- or oval-oblong, narrowed at the base, scarcely exceeding the pod; *bracts deciduous* with the flowers or fruits; caruncle as long as and nearly enveloping the stalk-like base of the minutely hairy seed. — Pine barrens of N. J. and Del. to Ky., and southward.

8. **P. Nuttàllii,** Torr. & Gray. Resembles the last, but usually lower; spikes cylindrical, narrow; flowers duller or greenish purple, on very short *pedicels;* the awl-shaped scaly *bracts persistent* on the axis after the flowers or fruits fall; seed very hairy, the caruncle smaller. — Dry sandy soil, coast of Mass. to Mo., and southward. — Spike sometimes rather loose.

9. **P. Curtíssii,** Gray. Slender (9′ high); leaves, etc., as in the two preceding, flowers rose-purple, in usually short racemes; pedicels about equalling or exceeding the persistent bracts; *the narrow oblong erect wings fully twice the length of the pod:* caruncle small, on one side of the stalk-like base of the very hairy *seed,* which is *conspicuously apiculate at the broader end.* — Md. to Ga. — The species was founded upon an abnormal form with elongated racemes and pedicels.

* * * *Annuals with at least the lower stem-leaves whorled in fours, sometimes in fives; spikes terminating the stem and branches; fl. summer and autumn.*

+- *Spikes short and thick* (4 – 9″ *in diameter*)*; bracts persisting after the fall of the* (*middle-sized*) *rose or greenish purple flowers; crest small.*

10. **P. cruciàta,** L. Stems (3 – 10′ high) almost winged at the angles, with spreading opposite branches; leaves nearly all in fours, linear and somewhat spatulate or oblanceolate; *spikes sessile or nearly so; wings broadly*

*deltoid-ovate, slightly heart-shaped, tapering to a bristly point* or rarely pointless; caruncle nearly as long as the seed. — Margin of swamps, Maine to Va. and southward near the coast, and west to Minn. and Neb.

11. **P. brevifòlia,** Nutt. Rather slender, branched above; leaves scattered on the branches, narrower; *spikes peduncled; wings lanceolate-ovate, pointless or barely mucronate.* — Margin of sandy bogs, R. I., N. J., and southward.

+ + *Spikes slender (about 2″ thick), the bracts falling with the flowers, which are small, greenish-white or barely tinged with purple, the crest of the keel larger.*

12. **P. verticillàta,** L. Slender (6–10′ high), much branched; stem-leaves all whorled, those of the (mostly opposite) branches scattered, linear, acute; spikes peduncled, usually short and dense, acute; wings round, clawed; the 2-lobed caruncle half the length of the seed. — Dry soil; common.

Var. **ambígua.** Leaves (and branches) all scattered or the lowest in fours; spikes long-peduncled, more slender, the flowers often purplish and scattered. (P. ambigua, *Nutt.*) — N. Y. to Mo., and southward.

* * * * *Biennials or annuals, with alternate leaves, and yellow flowers, which are disposed to turn greenish in drying; crest small; flowering all summer.*

13. **P. lùtea,** L. Low; *flowers (bright orange-yellow) in solitary ovate or oblong heads* (¾′ thick) terminating the stem or simple branches; leaves (1–2′ long) obovate or spatulate; lobes of the *caruncle nearly as long as the seed.* — Sandy swamps, N. J. and southward, near the coast.

14. **P. ramòsa,** Ell. *Flowers (citron-yellow) in numerous short and dense spike-like racemes* collected in a flat-topped *compound cyme;* leaves oblong-linear, the lowest spatulate or obovate; *seeds* ovoid, minutely hairy, *twice the length of the caruncle.* — Damp pine-barrens, Del. and southward.

15. **P. cymòsa,** Walt. Stem short, naked above, the numerous racemes in a usually nearly simple cyme, leaves narrow, acuminate; seeds globose, without caruncle. — Del. and southward.

## ORDER 32. LEGUMINÒSÆ. (PULSE FAMILY.)

*Plants with papilionaceous or sometimes regular flowers,* 10 *(rarely* 5 *and sometimes many) monadelphous, diadelphous, or rarely distinct stamens, and a single simple free pistil, becoming a legume in fruit. Seeds mostly without albumen. Leaves alternate, with stipules, usually compound.* One of the sepals inferior (i. e. next the bract); one of the petals superior (i. e. next the axis of the inflorescence). — A very large order (nearly free from noxious qualities), of which the principal representatives in northern temperate regions belong to the first of the three suborders it comprises.

SUBORDER I. **Papilionaceæ.** Calyx of 5 sepals, more or less united, often unequally so. Corolla inserted into the base of the calyx, of 5 irregular petals (or very rarely fewer), more or less distinctly *papilionaceous,* i. e. with the upper or odd petal (*vexillum* or *standard*) larger than the others and enclosing them in the bud, usually turned backward or spreading; the two lateral ones (*wings*) oblique and exterior to the two lower, which last are connivent and commonly more or less coherent by their anterior edges, forming the *carina* or *keel*, which usually encloses the stamens and pistil. Stamens 10, very rarely 5, inserted with the corolla, monadelphous, diadelphous (mostly with 9 united into a tube which is cleft on the upper side, and the tenth or upper one separate), or occasionally distinct. Ovary 1-celled, sometimes 2-celled by an intrusion of one of the sutures, or transversely 2–many-celled by cross-division into joints; style simple; ovules amphitropous, rarely anatropous. Cotyledons large, thick or thickish; radicle incurved. — Leaves simple or simply compound, the earliest ones in germination usually opposite, the rest alternate; leaflets almost always quite entire. Flowers perfect, solitary and axillary, or in spikes, racemes, or panicles.

I. Stamens (10) distinct.

* Leaves palmately 3-foliolate or simple; calyx 4–5-lobed; herbs. (PODALYRIEÆ.)

1 **Baptisia.** Pod inflated.

2. **Thermopsis.** Pod flat, linear.

* * Leaves pinnate; calyx-teeth short. (SOPHOREÆ.)

3. **Cladrastis.** Flowers panicled, white. Pod flat. A tree.

4. **Sophora.** Flowers racemose, white. Pod terete, moniliform. Herbaceous.

II. Stamens monadelphous, or diadelphous (9 and 1, rarely 5 and 5); nearly distinct in n. 14.

* Anthers of two forms; stamens monadelphous; leaves digitate or simple; leaflets entire. (GENISTEÆ.)

5 **Crotalaria.** Calyx 5-lobed. Pod inflated. Leaves simple.

6. **Genista.** Calyx 2-lipped. Pod flat. Seed estrophiolate. Leaves simple. Shrubby.

7. **Cytisus.** Calyx 2-lipped. Pod flat. Seed strophiolate. Leaves 1–3-foliolate. Shrubby.

8. **Lupinus.** Calyx deeply 2-lipped. Pod flat. Leaves 7–11-foliolate.

* * Anthers uniform (except in n. 13 and 29).

+ Leaves digitately (rarely pinnately) 3-foliolate; leaflets denticulate or serrulate; stamens diadelphous; pods small, 1–few-seeded, often enclosed in the calyx or curved or coiled. (TRIFOLIEÆ.)

9. **Trifolium.** Flowers capitate. Pods membranaceous, 1–6-seeded. Petals adherent to the stamen-tube

10. **Melilotus.** Flowers racemed. Pod coriaceous, wrinkled, 1–2-seeded.

11. **Medicago.** Flowers racemed or spiked. Pods curved or coiled, 1–few-seeded.

+ + Leaves unequally pinnate (or digitate in n. 13); pod not jointed; not twining nor climbing (except n. 20).

++ Flowers umbellate (solitary in ours) on axillary peduncles. (LOTEÆ.)

12. **Hosackia.** Leaves 1–3-foliolate. Peduncle leafy-bracteate. Pod linear.

++ ++ Flowers in spikes, racemes, or heads. (GALEGEÆ.)

= Herbage glandular-dotted; stamens mostly monadelphous; pod small, indehiscent, mostly 1-seeded; leaves pinnate (except in n. 13).

13. **Psoralea.** Corolla truly papilionaceous. Stamens 10, half of the anthers often smaller or less perfect. Leaves mostly palmately 3–5-foliolate.

14. **Amorpha.** Corolla of one petal! Stamens 10, monadelphous at base.

15. **Dalea.** Corolla imperfectly papilionaceous. Stamens 9 or 10; the cleft tube of filaments bearing 4 of the petals about its middle.

16. **Petalostemon.** Corolla scarcely at all papilionaceous. Stamens 5; the cleft tube of filaments bearing 4 of the petals on its summit.

= = Herbage not glandular-dotted (except in n. 23); stamens mostly diadelphous; pod 2-valved, several-seeded; leaves pinnately several-foliolate; flowers racemose.

*a.* Wings cohering with the keel; pod flat or 4-angled; hoary perennial herbs.

17. **Tephrosia.** Standard broad. Pod flat. Leaflets pinnately veined.
18. **Indigofera.** Calyx and standard small. Pod 4-angled. Leaflets obscurely veined.

*b.* Flowers large and showy; standard broad; wings free; woody; leaflets stipellate.

19. **Robinia.** Pod flat, thin, margined on one edge. Trees or shrubs.
20. **Wistaria.** Pod tumid, marginless. Woody twiners; leaflets obscurely stipellate.

*c.* Standard narrow, erect; pod turgid or inflated; perennial herbs.

21. **Astragalus.** Keel not tipped with a point or sharp appendage. Pod with one or both the sutures turned in, sometimes dividing the cell lengthwise into two.
22. **Oxytropis.** Keel tipped with an erect point; otherwise as Astragalus.
23. **Glycyrrhiza.** Flowers, etc., of Astragalus. Anther-cells confluent. Pod prickly or muricate, short, nearly indehiscent.

+ + + Herbs with pinnate or pinnately 1–3-foliolate leaves; no tendrils; pod transversely 2-several-jointed, the reticulated 1-seeded joints indehiscent, or sometimes reduced to one such joint. (Hedysareæ.)

= Leaves pinnate, with several leaflets, not stipellate.

24 **Æschynomene.** Stamens equally diadelphous (5 and 5). Calyx 2-lipped. Pod several-jointed; joints square.
25. **Coronilla.** Stamens unequally diadelphous (9 and 1). Calyx 5-toothed. Joints oblong, 4-angled. Flowers umbellate
26. **Hedysarum.** Stamens unequally diadelphous (9 and 1). Calyx 5-cleft. Pod several-jointed; joints roundish.

= = Leaves pinnately 3-foliolate, rarely 1-foliolate.

27. **Desmodium.** Stamens diadelphous (9 and 1) or monadelphous below. Calyx 2-lipped. Pod several-jointed. Flowers all of one sort and complete. Leaflets stipellate.
28. **Lespedeza.** Stamens diadelphous (9 and 1); anthers uniform. Pod 1–2-jointed. Flowers often of 2 sorts, the more fertile ones apetalous. Leaflets not stipellate.
29. **Stylosanthes.** Stamens monadelphous; anthers of 2 sorts. Pod 1–2-jointed. Calyx deciduous, the tube narrow and stalk-like. Leaflets not stipellate.

+ + + + Herbs with abruptly pinnate leaves, terminated by a tendril or bristle; stamens diadelphous; pod continuous, 2-valved, few-several-seeded. (Vicieæ.)

30. **Vicia.** Wings adherent to the keel. Style filiform, bearded with a tuft or ring of hairs at the apex.
31. **Lathyrus.** Wings nearly free. Style somewhat dilated and flattened upwards, bearded down the inner face.

+ + + + + Twining (sometimes only trailing) herbs; leaves pinnately 3- (rarely 1- or 5–7-) foliolate; no tendrils; peduncles or flowers axillary pod not jointed, 2-valved. (Phaseoleæ.)

= Leaves pinnate.

32. **Apios.** Herbaceous twiner; leaflets 5–7. Keel slender and much incurved or coiled.

= = Leaves 3-foliolate. Ovules and seeds several. Flowers not yellow.

33. **Phaseolus.** Keel spirally coiled; standard recurved-spreading. Style bearded lengthwise. Flowers racemose. Seeds round-reniform.
34. **Strophostyles.** Keel long, strongly incurved. Style bearded lengthwise. Flowers sessile, capitate, few. Seeds oblong, mostly pubescent.
35. **Centrosema.** Calyx short, 5-cleft. Standard with a spur at the base; keel broad, merely incurved. Style minutely bearded next the stigma.
36. **Clitoria.** Calyx tubular, 5-lobed. Standard erect, spurless; keel scythe-shaped. Style bearded down the inner face.
37. **Amphicarpæa.** Calyx tubular, 4–5-toothed. Standard erect; keel almost straight. Style beardless. Some nearly apetalous fertile flowers next the ground.

38. **Galactia.** Calyx 4-cleft, the upper lobe broadest and entire. Style beardless. Bract and bractlets minute, mostly deciduous.

= = = Leaves 1 – 3-foliolate. Ovules and seeds only one or two. Flowers yellow.

39. **Rhynchosia.** Keel scythe-shaped. Calyx 4 – 5-parted. Pod short.

SUBORDER II. **Cæsalpinieæ.** (BRASILETTO FAMILY.) Corolla imperfectly or not at all papilionaceous, sometimes nearly regular, imbricated in the bud, the upper or odd petal inside and enclosed by the others, Stamens 10 or fewer, commonly distinct, inserted on the calyx. Seeds anatropous, often with albumen. Embryo straight.

* Flowers imperfectly papilionaceous, perfect. Trees.

40. **Cercis.** Calyx campanulate, 5-toothed. Pod flat, wing-margined. Leaves simple.

* * Flowers not at all papilionaceous, perfect. Calyx 5-parted. Herbs.

41. **Cassia.** Leaves simply and abruptly pinnate, not glandular-punctate.
42. **Hoffmanseggia.** Leaves bipinnate, glandular-punctate.

* * * Flowers not at all papilionaceous, polygamous or diœcious. Trees.

43. **Gymnocladus.** Leaves all doubly pinnate. Calyx-tube elongated, at its summit bearing 5 petals resembling the calyx-lobes. Stamens 10.
44. **Gleditschia.** Thorny; leaves simply and doubly pinnate. Calyx-tube short; its lobes, petals, and the stamens 3 – 5.

SUBORDER III. **Mimoseæ.** (MIMOSA FAMILY.) Flower regular, small. Corolla valvate in æstivation, often united into a 4 – 5-lobed cup, hypogynous, as are the (often very numerous) exserted stamens. Embryo straight. Leaves twice pinnate.

45. **Desmanthus.** Petals distinct. Stamens 5 or 10. Pod smooth.
46. **Schrankia.** Petals united below into a cup. Stamens 8 or 10. Pod covered with small prickles or rough projections.

## 1. BAPTÍSIA, Vent. FALSE INDIGO.

Calyx 4 – 5-toothed. Standard not longer than the wings, its sides reflexed; keel-petals nearly separate, and, like the wings, straight. Stamens 10, distinct. Pod stalked in the persistent calyx, roundish or oblong, inflated, pointed, many-seeded. — Perennial herbs, with palmately 3-foliolate (rarely simple) leaves, which generally blacken in drying, and racemed flowers. (Named from βαπτίζω, *to dye*, from the economical use of some species, which yield a poor indigo.)

* *Racemes many, short and loose, terminal, often leafy at base, flowers yellow.*

1. **B. tinctòria,** R. Br. (WILD INDIGO.) Smooth and slender (2 – 3° high), rather glaucous; leaves almost sessile, leaflets rounded wedge-obovate (½ – 1½′ long); stipules and bracts minute and deciduous; pods oval-globose, on a stalk longer than the calyx. — Sandy dry soil, N. Eng. to Fla., west to Minn. and La.

* * *Racemes fewer, opposite the leaves.*

+ *Flowers yellow.*

2. **B. villòsa,** Ell. Sometimes soft-hairy, usually minutely pubescent when young, erect (2 – 3° high) with divergent branches; leaves almost ses-

sile; leaflets wedge-lanceolate or obovate; lower stipules lanceolate and persistent, on the branchlets often small and subulate; racemes many-flowered; pedicels short; bracts subulate, mostly deciduous; pods ovoid-oblong and taper-pointed, minutely pubescent. — Va. to N. C. and Ark.

+ + *Flowers white or cream-color.*

3. **B. leucophæa,** Nutt. *Hairy, low* (1° high), with *divergent branches; leaves almost sessile*, leaflets narrowly oblong-obovate or spatulate; *stipules and bracts large and leafy, persistent; racemes long* (often 1°), *reclined; flowers on elongated pedicels, cream-color;* pods pointed at both ends, hoary. — Mich. to Minn., south to Tex. April, May.

4. **B. leucántha,** Torr. & Gray. *Smooth;* stems, leaves, and racemes as in n. 6; *stipules early deciduous; flowers white; pods oval-oblong, raised on a stalk fully twice the length of the calyx.* — Alluvial soil, Ont. and Ohio to Minn., south to Fla. and La.

5. **B. álba,** R. Br. *Smooth* (1 – 3° high), *the branches slender and widely spreading; petioles slender; stipules and bracts minute* and deciduous; leaflets oblong or oblanceolate; racemes slender on a long naked peduncle; *pods linear-oblong* (1 – 1½′ long), *short-stalked.* — Dry soil, S. Ind. and Mo., to La., N. C., and Fla. July.

+ + + *Flowers indigo-blue.*

6. **B. austràlis,** R. Br. (BLUE FALSE-INDIGO.) Smooth, tall and stout (4 - 5°); leaflets oblong-wedge-form, obtuse; stipules lanceolate, as long as the petioles, rather persistent; raceme elongated (1 – 2°) and many-flowered, erect; bracts deciduous; stalk of the oval-oblong pods about the length of the calyx. — Alluvial soil, Penn. to Ga., west to S. Ind., Mo., and Ark.

## 2. THERMÓPSIS, R. Br.

Pod sessile or shortly stipitate in the calyx, flat, linear, straight or curved. Otherwise nearly as Baptisia. — Perennial herbs, with palmately 3-foliolate leaves and foliaceous stipules, not blackening in drying, and yellow flowers in terminal racemes. (Name from θέρμος, *the lupine*, and ὄψις, *resemblance*.)

1. **T. móllis,** M. A. Curtis. Finely appressed-pubescent, 2 – 3° high; leaflets rhombic-lanceolate, 1 – 3′ long; stipules narrow, mostly shorter than the petiole; raceme elongated; pods narrow, short-stipitate, somewhat curved, 2 – 4′ long. — Mountains of S. Va. and N. C.

2. **T. rhombifòlia,** Nutt. Low, with smaller leaves and broad conspicuous stipules; racemes short, few-flowered; pods broadly linear, spreading, usually strongly curved. — Sask. to E. Col., near or in the mountains, reported from central Kan.

## 3. CLADRÁSTIS, Raf. YELLOW-WOOD.

Calyx 5-toothed. Standard large, roundish, reflexed; the distinct keel-petals and wings straight, oblong. Stamens 10, distinct; filaments slender, incurved above. Pod short-stalked above the calyx, linear, flat, thin, marginless, 4 – 6-seeded, at length 2-valved. — A handsome tree, with yellow wood, smooth bark, nearly smooth pinnate leaves of 7 – 11 oval or ovate leaflets, and ample panicled racemes (10 – 20′ long) of showy white flowers drooping from the ends of the branches. Stipules obsolete. Base of the petioles hollow, enclosing the leaf-buds of the next year. Bracts minute and fugacious. (Name from κλαδος, *a branch*, and θραυστός, *brittle*.)

1. **C. tinctòria,** Raf. Sometimes 50° high; pods 3 – 4′ long. — Rich hillsides, central Ky. and Tenn. to N. C. Also in cultivation. The wood yields a yellow dye.

## 4. SOPHÒRA, L.

Calyx bell-shaped, shortly 5-toothed. Standard rounded; keel nearly straight. Stamens distinct or nearly so. Pod coriaceous, stipitate, terete, more or less constricted between the seeds, indehiscent. Seeds subglobose. — Shrubby or ours an herbaceous perennial, the leaves pinnate with numerous leaflets, and flowers white or yellow in terminal racemes. (Said by Linnæus to be the ancient name of an allied plant.)

1. **S. serícea,** Nutt. Silky-canescent, erect, 1° high or less; leaflets oblong-obovate, 3 – 6″ long; flowers white; pods few-seeded. — Central Kan. to Col., Tex., and Ariz.

## 5. CROTALÀRIA, L. RATTLE-BOX.

Calyx 5-cleft, scarcely 2-lipped. Standard large, heart-shaped; keel scythe-shaped. Sheath of the monadelphous stamens cleft on the upper side; 5 of the anthers smaller and roundish. Pod inflated, oblong, many-seeded. — Herbs with simple leaves. Flowers yellow. (Name from κρόταλον, *a rattle;* the loose seeds rattling in the coriaceous inflated pods.)

1. **C. sagittàlis,** L. Annual, hairy (3 – 6′ high); leaves oval or oblong-lanceolate, scarcely petioled; stipules united and decurrent on the stem, so as to be inversely arrow-shaped; peduncles few-flowered; corolla not longer than the calyx; pod blackish. — Sandy soil; Maine to Ill., Minn., Kan., and southward.

## 6. GENÍSTA, L. WOAD-WAXEN. WHIN.

Calyx 2-lipped. Standard oblong-oval, spreading, keel oblong, straight, deflexed. Stamens monadelphous, the sheath entire; 5 alternate anthers shorter. Pod mostly flat and several-seeded. — Shrubby plants, with simple leaves, and yellow flowers. (Name from the Celtic *gen*, a bush.)

**G.** TINCTÒRIA, L. (DYER'S GREEN-WEED.) Low, not thorny, with striate-angled erect branches; leaves lanceolate; flowers in spiked racemes. — Established on sterile hills, eastern N. Y. and Mass. (Adv. from Eu.)

## 7. CÝTISUS, Tourn. BROOM.

Calyx campanulate, with 2 short broad lips. Petals broad, the keel obtuse and slightly incurved. Stamens monadelphous. Pod flat, much longer than the calyx. Seeds several, with a strophiole at the hilum. — Shrubs, with stiff green branches, leaves mostly digitately 3-foliolate, and large bright yellow flowers. (The ancient Roman name of a plant, probably a Medicago.)

**C.** SCOPÀRIUS, Link. (SCOTCH BROOM.) Glabrous or nearly so (3 – 5° high); leaflets small, obovate, often reduced to a single one; flowers solitary or in pairs, on slender pedicels, in the axils of the old leaves, forming leafy racemes along the upper branches; style very long and spirally incurved. — Va. and southward. (Nat. from Eu.)

### 8. LUPÌNUS, Tourn. LUPINE.

Calyx very deeply 2-lipped. Sides of the standard reflexed; keel scythe-shaped, pointed. Sheath of the monadelphous stamens entire; anthers alternately oblong and roundish. Pod oblong, flattened, often knotty by constrictions between the seeds. Cotyledons thick and fleshy. — Herbs, with palmately 1 – 15-foliolate leaves, stipules adnate to base of the petiole, and showy flowers in terminal racemes or spikes. (Name from *Lupus*, a wolf, because these plants were thought to devour the fertility of the soil.)

1. **L. perénnis,** L. (WILD LUPINE.) Perennial, somewhat hairy; stem erect (1 – 2°); leaflets 7 – 11, oblanceolate; flowers in a long raceme, showy, purplish-blue (rarely pale); pods broad, very hairy, 5 – 6-seeded. — Sandy soil, N. Eng. to Minn., Mo., and south to the Gulf. — Var. OCCIDENTÀLIS, Watson, has stems and petioles more villous. — Mich. and Wisc.

2. **L. pusíllus,** Pursh. Annual, low, villous; leaflets usually 5; racemes short, sessile; flowers purple or rose-color; pods oval, hirsute, 2-seeded. — Central Dak. and Kan., and westward.

### 9. TRIFÒLIUM, Tourn. CLOVER. TREFOIL.

Calyx persistent, 5-cleft, the teeth bristle-form. Corolla mostly withering or persistent; the claws of all the petals, or of all except the oblong or ovate standard, more or less united below with the stamen-tube; keel short and obtuse. Tenth stamen more or less separate. Pods small and membranous, often included in the calyx, 1 – 6-seeded, indehiscent, or opening by one of the sutures. — Tufted or diffuse herbs. Leaves mostly palmately, sometimes pinnately 3-foliolate; leaflets usually toothed. Stipules united with the petiole. Flowers in heads or spikes. (Name from *tres*, three, and *folium*, a leaf.)

* *Flowers sessile in dense heads; corolla purple or purplish, withering away after flowering, tubular below, the petals more or less coherent with each other.*

+ *Calyx-teeth silky-plumose, longer than the whitish corolla; root annual.*

**T.** ARVÉNSE, L. (RABBIT-FOOT or STONE CLOVER.) Silky, branching (5 – 10′ high); leaflets oblanceolate; heads becoming very soft-silky and grayish, oblong or cylindrical. — Old fields, etc. (Nat. from Eu.)

+ + *Calyx scarcely hairy except a bearded ring in the throat, shorter than the rose-purple elongated-tubular corolla. (Short-lived perennials; flowers sweet-scented.)*

**T.** PRATÉNSE, L. (RED C.) Stems ascending, somewhat hairy; *leaflets oval or obovate, often notched* at the end and marked on the upper side with a pale spot; *stipules broad, bristle-pointed; heads ovate, sessile.* — Fields and meadows; largely cultivated. (Adv. from Eu.)

**T.** MÈDIUM, L. (ZIGZAG C.) Stems zigzag, smoothish; *leaflets oblong, entire,* and spotless; *heads mostly stalked;* flowers deeper purple, otherwise too like the last. — Dry hills, N. Scotia to E. Mass. (Adv. from Eu.)

* * *Flowers pedicelled in umbel-like round heads on a naked peduncle, their short pedicels reflexed when old; corolla white or rose-color, withering-persistent and turning brownish in fading; the tubular portion short.*

1. **T. refléxum,** L. (BUFFALO C.) Annual or biennial; *stems ascending, downy; leaflets obovate-oblong,* finely toothed; stipules thin, ovate; standard rose-red, wings and keel whitish; calyx-teeth hairy; pods 3 - 5-seeded. — Western N. Y. and Ont. to Iowa, Kan., and southward.

2. **T. stoloníferum,** Muhl. (Running Buffalo-C.) Smooth, *perennial; stems with long runners* from the base; *leaflets broadly obovate or obcordate*, minutely toothed; heads loose; flowers white, tinged with purple; pods 2-seeded. — Open woodlands and prairies, Ohio and Ky., west to Iowa and Kan.

3. **T. rèpens,** L. (White C.) Smooth, perennial; the slender *stems spreading and creeping; leaflets inversely heart-shaped* or merely notched, obscurely toothed; stipules scale-like, narrow; petioles and especially the peduncles very long; heads small and loose; *calyx much shorter than the white corolla;* pods about 4-seeded. — Fields and copses, everywhere. Indigenous only in the northern part of our range, if at all.

4. **T. Caroliniànum,** Michx. Somewhat pubescent small perennial, *procumbent, in tufts;* leaflets wedge-obovate and slightly notched; stipules ovate, foliaceous; heads small on slender peduncles; *calyx-teeth* lanceolate, nearly *equalling the purplish corolla; standard pointed;* pods 4-seeded. — Waste ground near Philadelphia, south to Va., Fla., and Tex.

**T.** hýbridum, L. (Alsike C.) Resembling T. repens, but the stems erect or ascending, not rooting at the nodes; flowers rose-tinted. — Becoming common. (Nat. from Eu.)

* * * *Flowers short-pedicelled in close heads, reflexed when old; corolla yellow, persistent, turning dry and chestnut-brown with age, the standard becoming hood-shaped; annuals, fl. in summer.*

**T.** agràrium, L. (Yellow or Hop-C.) Smoothish, somewhat upright (6 – 12′ high); *leaflets obovate-oblong, all three from the same point* (palmate) and nearly sessile; *stipules narrow, cohering with the petiole for more than half its length.* — Sandy fields and roadsides; N. Scotia to Va.; also in western N. Y. (Nat. from Eu.)

**T.** procúmbens, L. (Low Hop-C.) Stems spreading or ascending, pubescent (3 – 6′ high); *leaflets wedge-obovate*, notched at the end, *the lateral at a small distance from the other* (pinnately 3-foliolate); *stipules ovate, short.* — Sandy fields and roadsides, common. — Var. mìnus, Gray, has smaller heads, the standard not much striate with age. (Nat. from Eu.)

### 10. MELILÒTUS, Tourn. Melilot. Sweet Clover.

Flowers much as in Trifolium, but in spike-like racemes, small; corolla deciduous, free from the stamen-tube. Pod ovoid, coriaceous, wrinkled, longer than the calyx, scarcely dehiscent, 1 – 2-seeded. — Annual or biennial herbs, fragrant in drying, with pinnately 3-foliolate leaves, leaflets toothed. (Name from *μέλι, honey*, and *λωτός*, some leguminous plant.)

**M.** officinàlis, Willd. (Yellow Melilot.) Upright (2 – 4° high); leaflets obovate-oblong, obtuse; *corolla yellow;* the petals nearly of equal length. — Waste or cultivated grounds. (Adv. from Eu.)

**M.** álba, Lam. (White M.) Leaflets truncate; *corolla white;* the standard longer than the other petals. — In similar places. (Adv. from Eu.)

### 11. MEDICÀGO, Tourn. Medick.

Flowers nearly as in Melilotus. Pod 1 – several-seeded, scythe-shaped, incurved, or variously coiled. — Leaves pinnately 3-foliolate; leaflets toothed; stipules often cut. (*Μηδική*, the name of Lucerne, because it came to the Greeks from Media.)

**M.** satìva, L. (Lucerne. Alfalfa.) Upright, smooth, perennial; leaflets obovate-oblong, toothed; *flowers* (*purple*) *racemed;* pods spirally twisted. — Cultivated for green fodder; spontaneous from Mass. to Minn. and Kan. (Adv. from Eu.)

**M. LUPULÌNA**, L. (BLACK MEDICK. NONESUCH.) Procumbent, pubescent, annual; leaflets wedge-obovate, toothed at the apex; *flowers in short spikes* (yellow); *pods kidney-form*, 1-seeded. — Waste places, N. Eng. to Fla., west to Mich., Iowa, and Mo. (Adv. from Eu.)

**M. MACULÀTA**, Willd. (SPOTTED MEDICK.) Spreading or procumbent annual, somewhat pubescent; leaflets obcordate, with a purple spot, minutely toothed; *peduncles* 3 – 5-*flowered;* flowers yellow; *pods compactly spiral*, of 2 or 3 turns, compressed, *furrowed on the thick edge*, and fringed with a double row of curved prickles. — N. Brunswick to Mass. (Adv. from Eu.)

**M. DENTICULÀTA**, Willd. Nearly glabrous; *pods loosely spiral, deeply reticulated*, and with a *thin keeled edge;* otherwise like the last, and with the same range. (Adv. from Eu.)

## 12. HOSÁCKIA, Douglas.

Calyx-teeth nearly equal. Petals free from the diadelphous stamens; standard ovate or roundish, its claw often remote from the others; wings obovate or oblong; keel incurved. Pod linear, compressed or somewhat terete, sessile, several-seeded. — Herbs, with pinnate leaves (in ours 1 – 3-foliolate, with gland-like stipules), and small yellow or reddish flowers in umbels (ours solitary) upon axillary leafy-bracteate peduncles. (Named for *Dr. David Hosack*, of New York.)

1. **H. Purshiàna**, Benth. Annual, more or less silky-villous or glabrous, often 1° high or more; leaves nearly sessile, the 1 – 3 leaflets ovate to lanceolate (3 – 9″ long); peduncles often short, bracteate with a single leaflet. — N. C.; S. W. Minn. to Ark., and west to the Pacific. Very variable.

## 13. PSORÀLEA, L.

Calyx 5-cleft, persistent, the lower lobe longest. Stamens diadelphous or sometimes monadelphous. Pod seldom longer than the calyx, thick, often wrinkled, indehiscent, 1-seeded. — Perennial herbs, usually sprinkled all over or roughened (especially the calyx, pods, etc.) with glandular dots or points. Leaves mostly 3 – 5-foliolate. Flowers spiked or racemed, white or mostly blue-purplish. Root sometimes tuberous and farinaceous. (Name, *ψωραλέος*, *scurfy*, from the glands or dots.)

* *Leaves pinnately* 3-*foliolate.*

1. **P. Onóbrychis**, Nutt. Nearly smooth and free from glands, *erect* (3 – 5° high); *leaflets lanceolate-ovate, taper-pointed* (3′ long); *stipules and bracts awl-shaped;* racemes elongated; peduncle shorter than the leaves; pods roughened and wrinkled. — River-banks, Ohio to Ill. and Mo.; also south and east to S. C. July.

2. **P. stipulàta**, Torr. & Gray. Nearly smooth and glandless; *stems diffuse; leaflets ovate-elliptical*, reticulated; *stipules ovate; flowers in heads* on rather short peduncles; *bracts broadly ovate, sharp-pointed.* — Rocks, S. Ind. and Ky. June, July.

3. **P. melilotoìdes**, Michx. Somewhat pubescent, more or less glandular; *stems erect* (1 – 2° high), slender; *leaflets lanceolate or narrowly oblong; spikes oblong*, long-peduncled; *stipules awl-shaped;* bracts ovate or lanceolate, taper-pointed; pods strongly wrinkled transversely. — Dry soil, Fla. to Tenn., S. Ind. and Kan. June.

* * *Leaves palmately 3 – 5-foliolate ; roots not tuberous.*

4. **P. tenuiflòra,** Pursh. Slender, erect, much branched and bushy (2 – 4° high), *minutely hoary-pubescent* when young; leaflets varying from linear to obovate-oblong (½ – 1½′ long), glandular-dotted; *flowers* (2 – 3″ long) *in loose racemes;* lobes of the calyx and bracts ovate, acute; pod glandular. (P. floribunda, *Nutt.*) — Prairies, Minn. to Ill., Tex., and westward. June – Sept.

5. **P. argophýlla,** Pursh. *Silvery silky-white* all over, erect, divergently branched (1 – 3° high); leaflets *elliptical-lanceolate; spikes interrupted;* lobes of the calyx and *bracts lanceolate.* — High plains, N. Wisc. to Iowa, Kan., and westward. June. — Flowers 4 – 5″ long.

6. **P. digitàta,** Nutt. More slender and less hoary, 1 – 2° high; leaflets linear-oblanceolate; bracts of the interrupted spike obcordate; calyx-lobes oblong, acute. — Central Kan. to Col. and Tex.

7. **P. lanceolàta,** Pursh. Glabrous or nearly so, yellowish green, densely punctate; leaflets 3, linear to oblanceolate; flowers small, in very short spikes; calyx 1″ long, with short broad teeth. — Central Kan. to the Sask. and westward.

* * * *Leaves palmately 5-foliolate; root tuberous; spike-like racemes dense.*

8. **P. esculénta,** Pursh. Roughish hairy all over; stem stout (5 – 15′ high) and erect from a tuberous or turnip-shaped farinaceous root; leaflets obovate- or lanceolate-oblong; spikes oblong, long-peduncled; lobes of the calyx and bracts lanceolate, nearly equalling the corolla (½′ long). — High plains, Sask. to Wisc., Iowa, and Tex. June. The Pomme blanche, or Pomme de Prairie, of the voyageurs.

9. **P. hypogæ̀a,** Nutt. Tuber small; nearly acaulescent, hoary with appressed hairs; leaflets linear; spikes short-capitate, on peduncles ½ – 2′ long; calyx narrow, 3 – 6″ long. — Central Kan. to Col. and Tex.

10. **P. cuspidàta,** Pursh. Stout, tall, from a deep-seated tuber, hoary with appressed hairs; leaflets usually broadly oblanceolate, obtuse; flowers large, the petals (6 – 8″ long) exceeding the lanceolate-lobed calyx — Central Kan. to Col. and Tex.

### 14. AMÓRPHA, L. False Indigo.

Calyx inversely conical, 5-toothed, persistent. Standard (the other petals entirely wanting!) wrapped around the stamens and style. Stamens 10, monadelphous at the very base, otherwise distinct. Pod oblong, longer than the calyx, 1 – 2-seeded, roughened, tardily dehiscent. — Shrubs, with odd-pinnate leaves; the leaflets marked with minute dots, usually stipellate, the midvein excurrent. Flowers violet or purple, crowded in clustered terminal spikes. (Name, ἄμορφος, *deformed*, from the absence of four of the petals.)

* *Pods 1-seeded; leaflets small* (½′ long or less), *crowded.*

1. **A. canéscens,** Nutt. (Lead-Plant.) *Whitened with hoary down* (1 – 3° high); leaflets 15 – 25 pairs, oblong-elliptical, becoming smoothish above; spikes usually clustered at the summit. — Sask. to Ind. and Tex., west to the Rocky Mts.; also eastward to Ga.

2. **A. microphýlla,** Pursh. *Nearly glabrous* throughout, 1° high or less; leaflets rather rigid; spikes usually solitary. — Sask. to Minn. and Iowa, west to the Rocky Mts.

* * *Pods 2-seeded; leaflets larger, scattered.*

3. **A. fruticòsa,** L. (False Indigo.) A tall shrub, rather pubescent or smoothish, leaflets 8 - 12 pairs, oblong to broadly elliptical. — River-banks, S Penn. to Fla., west to Sask., Tex., and the Rocky Mts. Very variable.

## 15. DÀLEA, L.

Calyx 5-cleft or toothed. Corolla imperfectly papilionaceous; petals all on claws; the standard heart-shaped, inserted in the bottom of the calyx; the keel and wings borne on the middle of the monadelphous sheath of filaments, which is cleft down one side. Stamens 10, rarely 9. Pod membranaceous, 1-seeded, indehiscent, enclosed in the persistent calyx. — Mostly herbs, more or less glandular-dotted, with minute stipules; the small flowers in terminal spikes or heads (Named for *Samuel Dale*, an English botanist.)

* *Glabrous; flowers white or rose-color; leaflets* 4 - 20 *pairs; annuals.*

1. **D. alopecuroides,** Willd. Erect (1 - 2° high); leaflets 10 - 20 pairs, linear-oblong; flowers light rose-color or whitish, in cylindrical spikes; bracts ovate-lanceolate, acuminate, deciduous; calyx very villous, with long slender teeth. — Alluvial soil, Minn. to Ill. and Ala., west to the Rocky Mts.

2. **D. laxiflòra,** Pursh. Erect (1 - 4° high), branching; leaflets 3 - 5 pairs, linear, 2 - 3″ long; spikes loosely-flowered; bracts conspicuous, persistent, almost orbicular and very obtuse; petals white; calyx densely villous, the long teeth beautifully plumose. — Iowa and Mo. to Tex., west to Col.

* * *Pubescent: leaflets* 3 - 4 *pairs; perennial herbs.*

3. **D. aùrea,** Nutt. Stems erect and simple, 1 - 3° high; leaflets oblong-obovate to linear-oblong, more or less silky-pubescent; spikes solitary, oblong-ovate, very compact and densely silky; bracts short, rhombic-ovate; petals yellow. — On the plains, Mo. to Tex., and westward.

4. **D. lanàta,** Spreng. Very pubescent throughout, 1 - 2° high, branching; leaflets obovate to oblong-obovate, 2 - 3″ long; spikes slender, rather loose, the obovate acute bracts equalling the small short-toothed calyx; petals short, purple. — Central Kan. to Tex., and westward.

## 16. PETALOSTÈMON, Michx. Prairie Clover.

Calyx 5-toothed. Corolla indistinctly papilionaceous; petals all on thread-shaped claws, 4 of them nearly similar and spreading, borne on the top of the monadelphous and cleft sheath of filaments, alternate with the 5 anthers; the fifth (standard) inserted in the bottom of the calyx, heart-shaped or oblong. Pod membranaceous, enclosed in the calyx, indehiscent, 1 - 2-seeded. — Chiefly perennial herbs, upright, glandular-dotted, with crowded odd-pinnate leaves, minute stipules, and small flowers in very dense terminal and peduncled heads or spikes. (Name combined of the two Greek words for petal and stamen, alluding to the peculiar union of these organs in this genus.)

1. **P. violàceus,** Michx. *Smoothish; leaflets* 5, *narrowly linear; heads globose-ovate*, or oblong-cylindrical when old; bracts pointed, not longer than the silky-hoary calyx; *corolla rose-purple.* — Dry prairies, Minn. to Ind. and Tex., west to the Rocky Mts July.

2. **P. cándidus,** Michx. *Smooth; leaflets* 7 – 9, *lanceolate or linear-oblong; heads oblong,* when old cylindrical; bracts awned, longer than the nearly glabrous calyx; *corolla white.* — With n. 1.

3. **P. villòsus,** Nutt. *Soft-downy or silky* all over; *leaflets* 13 – 17, *linear or oblong,* small (4 – 5″ long); *spikes cylindrical* (1 – 5′ long), short-peduncled, soft-villous; *corolla rose-color.* — Wisc. to Mo., west to the Rocky Mts.

4. **P. foliòsus,** Gray. *Smooth,* very leafy; *leaflets* 15 – 29, *linear-oblong; spikes cylindrical,* short-peduncled; bracts slender-awned from a lanceolate base, exceeding the glabrous calyx; *petals rose-color.* — River-banks, Ill. and Tenn.

5. **P. multiflòrus,** Nutt. *Glabrous* throughout, erect, branching; leaflets 3 – 9, linear to oblong; *spikes globose,* the subulate-setaceous bracts much shorter than the acutely toothed calyx; petals white. — Kan. to Tex.

## 17. TEPHRÒSIA, Pers. HOARY PEA.

Calyx about equally 5-cleft. Standard roundish, usually silky outside, turned back, scarcely longer than the coherent wings and keel. Stamens monadelphous or diadelphous. Pod linear, flat, several-seeded, 2-valved. — Hoary perennial herbs, with odd-pinnate leaves, and white or purplish racemed flowers. Leaflets mucronate, veiny. (Name from τεφρός, *ash-colored* or *hoary.*)

1. **T. Virginiàna,** Pers. (GOAT'S RUE. CATGUT.) *Silky-villous* with whitish hairs when young; *stem erect and simple* (1 – 2° high), *leafy* to the top; leaflets 17 – 29, linear-oblong; flowers large and numerous, clustered in a terminal *oblong dense raceme or panicle,* yellowish-white marked with purple. — Dry sandy soil. June, July. — Roots long and slender, very tough.

2. **T. spicàta,** Torr. & Gray. *Villous with rusty hairs;* stems branched below, straggling or ascending (2° long), *few-leaved;* leaflets 9 – 15, obovate or oblong-wedge-shaped, often notched; *flowers few,* in a loose and interrupted *very long-peduncled spike,* reddish. — Dry soil, from Del. and Va. to Fla. and Miss. July.

3. **T. hispídula,** Pers. Hairy with some long and rusty or only minute and appressed pubescence; stems slender (9 – 24′ long), divergently branched, straggling; leaflets 5 – 15, oblong, varying to obovate-wedge-shaped and oblanceolate; *peduncles longer than the leaves,* 2 – 4-*flowered,* flowers reddish-purple. — Dry sandy soil, Va. to Fla. and Ala.

## 18. INDIGÒFERA, L. INDIGO.

Calyx small, equally 5-cleft. Standard roundish, silky outside, wings coherent; keel erect, gibbous or spurred at base. Stamens diadelphous; connective gland-like. Pod 1 – several-seeded, septate within between the seeds. — Herbs or shrubs, mostly canescent with appressed hairs fixed by the middle, with odd-pinnate faintly-nerved leaves, and pink or purplish flowers in naked axillary spikes. (So named because some of the species yield the indigo of commerce.)

1. **I. leptosépala,** Nutt. A perennial herb, ½ – 2° high; leaflets 5 – 9, oblanceolate; spikes very loose; pods linear, 6 – 9 seeded, obtusely 4-angled, reflexed, 1′ long. — Kan. to Tex. and Fla.

### 19. ROBÍNIA, L. Locust-tree.

Calyx short, 5-toothed, slightly 2-lipped. Standard large and rounded, turned back, scarcely longer than the wings and keel. Stamens diadelphous. Pod linear, flat, several-seeded, margined on the seed-bearing edge, at length 2-valved. — Trees or shrubs, often with prickly spines for stipules. Leaves odd-pinnate, the ovate or oblong leaflets stipellate. Flowers showy, in hanging axillary racemes. Base of the leaf-stalks covering the buds of the next year. (Named in honor of *John Robin,* herbalist to Henry IV. of France, and his son *Vespasian Robin,* who first cultivated the Locust-tree in Europe.)

1. **R. Pseudacàcia,** L. (Common Locust or False Acacia.) Branches naked; *racemes slender, loose;* flowers white, fragrant; pod smooth. — S. Penn. to Ind., Iowa, and southward. Commonly cultivated as an ornamental tree, and for its valuable timber; naturalized in many places. June.

2. **R. viscòsa,** Vent. (Clammy L.) *Branchlets and leaf-stalks clammy; flowers crowded in oblong racemes,* tinged with rose-color, nearly inodorous; pod glandular-hispid. — Va. to N. C. and Ga., in the mountains. Cultivated, like the last, and often escaped. June.

3. **R. híspida,** L. (Bristly L. or Rose Acacia.) Shrub 3 – 8° high; *branchlets and stalks bristly;* flowers large and deep rose-color, inodorous; pods glandular-hispid. — Varies with less bristly or nearly naked branchlets; also with smaller flowers, etc. — Mts. of Va. to N. C. and Ga. May, June.

### 20. WISTÀRIA, Nutt.

Calyx campanulate, somewhat 2-lipped; upper lip of 2 short teeth, the lower of 3 longer ones. Standard roundish, large, turned back, with 2 callosities at its base; keel scythe-shaped; wings doubly auricled at the base. Stamens diadelphous. Pods elongated, thickish, knobby, stipitate, many-seeded, at length 2-valved. Seeds large. — Woody twiners, climbing high, with minute stipules, pinnate leaves of 9 – 13 ovate-lanceolate leaflets, with or without minute stipels, and dense racemes of large and showy lilac-purple flowers. (Dedicated to the late *Professor Wistar,* of Philadelphia.)

1. **W. frutéscens,** Poir. Downy or smoothish when old; wings of the corolla with one short auricle and an awl-shaped one as long as the claw. — Alluvial grounds, Va. to Fla., west to S. Ind., Kan. and La. May. — Sometimes cultivated for ornament, as is the still handsomer Chinese species.

### 21. ASTRÁGALUS, Tourn. Milk-Vetch.

Calyx 5-toothed. Corolla usually long and narrow; standard narrow, equalling or exceeding the wings and blunt keel, its sides reflexed or spreading. Stamens diadelphous. Pod several – many-seeded, various, mostly turgid, one or both sutures usually projecting into the cell, either slightly or so as to divide the cavity lengthwise into two. — Chiefly herbs (ours perennials), with odd-pinnate leaves and spiked or racemed flowers. Mature pods are usually necessary for certain identification of the species. (The ancient Greek name of a leguminous plant, as also of the ankle-bone; but the connection between the two is past all guess.)

I. *Pod turgid, completely or imperfectly 2-celled by the intrusion of the dorsal suture, the ventral suture being not at all or less deeply inflexed.* — ASTRAGALUS proper.

* *Pod plum-shaped, succulent, becoming thick and fleshy, indehiscent, not stipitate, completely 2-celled.*

1. **A. caryocárpus,** Ker. (GROUND PLUM.) Pale and minutely appressed-pubescent; leaflets narrowly oblong; flowers in a short spike-like raceme; *corolla violet-purple; fruit glabrous, ovate-globular, more or less pointed,* about ⅔′ in diameter, *very thick-walled,* cellular or corky when dry. — Sask. and Minn. to Mo., Col., and Tex. May.

2. **A. Mexicànus,** A. DC. Smoother, or pubescent with looser hairs, larger; leaflets roundish, obovate, or oblong; flowers larger (10 – 12″ long); calyx softly hairy; *corolla cream-color, bluish only at the tip: fruit globular, very obtuse* and pointless, 1′ or more in diameter; otherwise like the last. — Prairies and open plains, Ill. to Kan., south to Tex. The unripe fruits of both resemble green plums — whence the popular name — and are eaten, raw or cooked, by travellers.

3. **A. Platténsis,** Nutt. Loosely villous; stipules conspicuous; leaflets oblong, often glabrous above; flowers crowded in a short spike or oblong head, cream-color often tinged or tipped with purple; *fruit ovate, pointed,* and with the calyx *villous.* — Gravelly or sandy banks, Minn. to Ind. and Ala., west to Col. and Tex. — Var. TENNESSEÉNSIS, Gray, has the pod oblong and slightly curved, and much less fleshy. May.

* * *Pod dry, coriaceous, cartilaginous or membranous, dehiscent.*

+– *Pod completely 2-celled, sessile.*

4. **A. mollíssimus,** Torr. *Stout, decumbent, densely silky-villous throughout and tomentose;* leaflets 19 – 29, ovate-oblong; peduncles elongated; spikes dense, with rather *large violet flowers* (6 – 12″ long); pod narrow-oblong (5 – 9″ long), glabrous, somewhat obcompressed and *sulcate at both sutures,* at length incurved. — Neb. to Kan. and Tex., west to Col. The most common "loco"-plant, and said to be very poisonous to cattle.

5. **A. Canadénsis,** L. *Tall and erect* (1 – 4° high), *somewhat pubescent or glabrate;* leaflets 21 – 27, oblong; *flowers greenish cream-color,* very numerous, in long dense spikes; pods crowded, oblong (6″ long), glabrous, *terete, scarcely sulcate* and only on the back, nearly straight. — River-banks, western N. Y. to N. Ga., and far westward.

6. **A. adsúrgens,** Pall. Ascending or decumbent (4 – 18′ high), cinereous with minute appressed pubescence or glabrate; leaflets about 21, narrowly or linear-oblong; spike dense, with medium-sized pale or purplish flowers; *pubescence of calyx appressed;* pod oblong (4 – 5″ long), *finely pubescent, triangular-compressed, with a deep dorsal furrow, straight.* — Red River valley, Minn., to W. Kan., and westward. (Asia.)

7. **A. hypoglóttis,** L. *Slender* (6′ – 2° long), diffusely procumbent or ascending, *with a rather loose pubescence* or nearly glabrous; leaflets 15 – 21, oblong, obtuse or retuse; *flowers violet, capitate; calyx loosely pubescent; pod* as in the last, but *ovate* and *silky-villous.* — Red River valley, Minn., to central Kan. and westward.

+ + *Pod not completely 2-celled.*

++ *Pod stipitate, pendent.*

8. **A. alpìnus,** L. *Diffuse* (6 – 12′ high), smooth or slightly hairy; leaflets 13 – 25; flowers *violet-purple*, or at least the keel tipped with violet or blue; calyx campanulate; pod narrowly oblong, short-acuminate, *black-pubescent*, triangular-turgid, deeply grooved on the back, straight or curved, its stipe usually rather exceeding the calyx. — Rocky banks, Lab. to Maine and N. Vt.

9. **A. Robbínsii,** Gray. Nearly smooth and *erect* (1° high), slender; leaflets 7 – 11; calyx more oblong; *flowers white;* pod oblong (6″ long), obtuse or acutish, *minutely darkish-pubescent*, somewhat laterally compressed, *not dorsally sulcate* or obsoletely so, straight or somewhat incurved, rather abruptly narrowed at base into the often included stipe. — Rocky ledges, Vt.

10. **A. racemòsus,** Pursh. Stout (1 – 2° high), erect or ascending, appressed-pubescent or glabrate; leaflets 13 – 25; flowers numerous, white, pendent; calyx campanulate, gibbous, white-pubescent; pod straight, narrow, 1′ long, acute at both ends, triangular-compressed, deeply grooved on the back, the ventral edge acute. — Neb. to Mo., and westward.

++ ++ *Pod sessile.*

11. **A. grácilis,** Nutt. Subcinereous, slender (1° high or more); leaflets 11 – 17, linear, obtuse or retuse; racemes loose; flowers small (3″ long); *pods pendent*, 2 – 3″ long, coriaceous, elliptic-ovate, *concave on the back*, the ventral suture prominent, *white-hairy*, at length glabrous, *transversely veined*. — Minn. to Neb. and Mo., and westward.

12. **A. distórtus,** Torr. & Gray. Low, diffuse, many-stemmed, subglabrous; leaflets 17 – 25, oblong, emarginate; flowers in a short spike, pale-purple; pod ovate- or lance-oblong, curved, 6 – 9″ long, glabrous, thick-coriaceous, somewhat grooved on the back, the ventral suture nearly flat. — Ill. to Iowa, Mo., Ark. and Tex.

13. **A. lotiflòrus,** Hook. Hoary or cinereous with appressed hairs; stems very short; leaflets 7 – 13, lance-oblong; flowers yellowish, in few-flowered heads, with peduncles exceeding the leaves or very short; *calyx campanulate, the subulate teeth exceeding the tube;* pod oblong-ovate, 9 – 12″ long, acuminate, *acute at base*, canescent, the back more or less impressed, the acute ventral suture nearly straight. — Sask. to Neb. and Tex., west to the mountains.

14. **A. Missouriénsis,** Nutt. Short-caulescent, hoary with a closely appressed silky pubescence; leaflets 5 – 15, oblong, elliptic or obovate; flowers few, capitate or spicate, 5 – 8″ long, violet; *calyx oblong, the teeth very slender;* pod oblong (1′ long), acute, *obtuse at base*, pubescent, nearly straight, obcompressed or obcompressed-triangular, depressed on the back and the ventral suture more or less prominent, transversely rugulose. — Sask. to Neb. and N. Mex.

II. *Pod 1-celled, neither suture being inflexed or the ventral more intruded than the dorsal.* — PHACA.

15. **A. Coòperi,** Gray. Nearly smooth, erect (1 – 2° high); leaflets 11 – 21, elliptical or oblong, somewhat retuse, minutely hoary beneath; flowers white, rather numerous in a short spike; calyx dark-pubescent; pod coriaceous, *inflated, ovate-globose* (6 – 9″ long), *acute, glabrous, slightly sulcate on both sides*, cavity webby. — Ont. and western N. Y. to Minn. and Iowa.

16. **A. flexuòsus,** Dougl. Ashy-puberulent, ascending (1 – 2° high); leaflets 11 – 21, mostly narrow; flowers small, in loose racemes; pod thin-coriaceous, *cylindric* (8 – 11″ long, 2″ broad), pointed, straight or curved, puberulent, very shortly stipitate. — Red River Valley, Minn., to Col.

## 22. OXÝTROPIS, DC.

Keel tipped with a sharp projecting point or appendage; otherwise as in Astragalus. Pod often more or less 2-celled by the intrusion of the ventral suture. — Our species are low, nearly acaulescent perennials, with tufts of numerous very short stems from a hard and thick root or rootstock, covered with scaly adnate stipules; pinnate leaves of many leaflets; peduncles scape-like, bearing a head or short spike of flowers. (Name from *ὀξύς*, *sharp*, and *τρόπις*, *keel.*)

* *Leaves simply pinnate.*

1. **O. campéstris,** DC., var. **cærùlea,** Koch. *Pubescent or smoothish*; leaflets lanceolate or oblong; flowers violet or blue, sometimes pure white; *pods* ovate or oblong-lanceolate, of a *thin or papery* texture. — N. Maine to Labrador.

2. **O. Lambérti,** Pursh. *Silky with fine appressed hairs;* leaflets mostly linear; flowers larger, purple, violet, or sometimes white; *pods cartilaginous or firm-coriaceous* in texture, silky-pubescent, strictly erect, cylindraceous-lanceolate and long-pointed, almost 2-celled by intrusion of the ventral suture. — Dry plains, Sask. and Minn. to Mo. and Tex., west to the mountains.

* * *Leaflets numerous, mostly in fascicles of* 3 *or* 4 *or more along the rhachis.*

3. **O. spléndens,** Dougl. Silvery silky-villous (6 – 12′ high); scape spicately several to many-flowered; flowers erect-spreading; pod ovate, erect, 2-celled, hardly surpassing the very villous calyx. — Plains of Sask. and W. Minn., to N. Mex. and the Rocky Mts.

## 23. GLYCYRRHÌZA, Tourn. LIQUORICE.

Calyx with the two upper lobes shorter or partly united. Anther-cells confluent at the apex, the alternate ones smaller. Pod ovate or oblong-linear, compressed, often curved, clothed with rough glands or short prickles, scarcely dehiscent, few-seeded. The flower, etc., otherwise as in Astragalus. — Long perennial root sweet (whence the name, from *γλυκύς*, *sweet*, and *ῥίζα*, *root*); herbage glandular-viscid; leaves odd-pinnate, with minute stipules; flowers in axillary spikes, white or bluish.

1. **G. lepidòta,** Nutt. (WILD LIQUORICE.) Tall (2 – 3° high); leaflets 15 – 19, oblong-lanceolate, mucronate-pointed, sprinkled with little scales when young, and with corresponding dots when old; spikes peduncled, short; flowers whitish; pods oblong, beset with hooked prickles, so as to resemble the fruit of Xanthium on a smaller scale. — Minn. to Iowa and Mo., and westward; Ft. Erie, Ont.

## 24. ÆSCHYNÓMENE, L. SENSITIVE JOINT-VETCH.

Calyx 2-lipped; the upper lip 2-, the lower 3-cleft. Standard roundish; keel boat-shaped. Stamens diadelphous in two sets of 5 each. Pod flattened, composed of several easily separable joints. — Leaves odd-pinnate, with several pairs of leaflets, sometimes sensitive, as if shrinking from the touch (whence the name, from *αἰσχυνομένη, being ashamed.*)

1. **Æ. híspida,** Willd. Erect, rough-bristly annual; leaflets 37 – 51, linear; racemes few-flowered; flowers yellow, reddish externally; pod stalked, 6 – 10-jointed. — Along rivers, S. Penn. to Fla. and Miss. Aug.

## 25. CORONÍLLA, L.

Calyx 5-toothed. Standard orbicular; keel incurved. Stamens diadelphous, 9 and 1. Pod terete or 4-angled, jointed; the joints oblong. — Glabrous herbs or shrubs, with pinnate leaves, and the flowers in umbels terminating axillary peduncles (Diminutive of *corona, a crown*, alluding to the inflorescence.)

**C.** VÀRIA, L. A perennial herb with ascending stems; leaves sessile; leaflets 15 – 25, oblong; flowers rose-color; pods coriaceous, 3 – 7-jointed, the 4-angled joints 3 – 4″ long. — Conn. to N. J. (Nat. from Eu.)

## 26. HEDÝSARUM, Tourn.

Calyx 5-cleft, the lobes awl-shaped and nearly equal. Keel nearly straight, obliquely truncate, not appendaged, longer than the wings. Stamens diadelphous, 5 and 1. Pod flattened, composed of several equal-sided separable roundish joints connected in the middle. — Perennial herbs; leaves odd-pinnate. (Name composed of *ἡδύς, sweet*, and *ἄρωμα, smell.*)

1. **H. boreàle,** Nutt. Leaflets 13 – 21, oblong or lanceolate, nearly glabrous; stipules scaly, united opposite the petiole; raceme of many deflexed purple flowers; standard shorter than the keel; joints of the pod 3 or 4, smooth, reticulated. — Lab. to northern Maine and Vt.; north shore of L. Superior, and north and westward.

## 27. DESMÒDIUM, Desv. TICK-TREFOIL.

Calyx usually more or less 2-lipped. Standard obovate; wings adherent to the straight or straightish and usually truncate keel, by means of a little transverse appendage on each side of the latter. Stamens diadelphous, 9 and 1, or monadelphous below. Pod flat, deeply lobed on the lower margin, separating into few or many flat reticulated joints (mostly roughened with minute hooked hairs, by which they adhere to the fleece of animals or to clothing). — Perennial herbs, with pinnately 3-foliolate (rarely 1-foliolate) leaves, stipellate. Flowers (in summer) in axillary or terminal racemes, often panicled, and 2 or 3 from each bract, purple or purplish, often turning green in withering. Stipules and bracts scale-like, often striate (Name from *δεσμός, a bond* or *chain*, from the connected joints of the pods.)

§ 1. *Pod raised on a stalk (stipe) many times longer than the slightly toothed calyx and nearly as long as the pedicel, straightish on the upper margin, deeply sinuate on the lower; the 1 – 4 joints mostly half-obovate and concave on the back; stamens monadelphous below; plants nearly glabrous; stems erect or ascending; raceme terminal, panicled; stipules bristle-form, deciduous.*

1. **D. nudiflòrum,** DC *Leaves all crowded at the summit of sterile stems;* leaflets broadly ovate, bluntish, whitish beneath; *raceme elongated on an ascending mostly leafless stalk or scape from the root,* 2° long. — Dry woods, common.

2. **D. acuminàtum,** DC. *Leaves all crowded at the summit of the stem from which arises the elongated naked raceme or panicle;* leaflets round-ovate, taper-pointed, green both sides, the end one round (4 – 5′ long). — Rich woods, from Canada to the Gulf.

3. **D. pauciflòrum,** DC. *Leaves scattered* along the low (8 – 15′ high) ascending stems; leaflets rhombic-ovate, bluntish, pale beneath; *raceme few-flowered,* terminal. — Woods, Ont. to Penn., Mich., Kan., and southward.

§ 2. *Pod raised on a stalk (stipe) little if at all surpassing the deeply cleft calyx; stems long and prostrate or decumbent; racemes axillary and terminal.*

* *Stipules conspicuous, ovate, attenuate, striate, persistent; racemes mostly simple.*

4. **D. rotundifòlium,** DC. *Soft-hairy all over,* truly prostrate; *leaflets orbicular,* or the odd one slightly rhomboid; *flowers purple;* pods almost equally sinuate on both edges, 3 – 5-jointed; the joints rhomboid-oval. — Dry rocky woods, N. Eng. to Fla., west to Minn., Mo., and La.

Var. **glabràtum,** Gray, is almost glabrous, otherwise nearly as the ordinary form. — Mass. and N. Y.

5. **D. ochroleùcum,** M. A. Curtis. *Stems sparsely hairy,* decumbent; leaflets nearly glabrous, ovate, acute or obtuse, transversely reticulated beneath, the lateral ones smaller or sometimes wanting; racemes much elongated; *corolla whitish; pods twisted,* 2 – 4-jointed, the large rhomboid joints smooth and reticulated but the margins downy. — Woodlands, Md. and Va.

* * *Stipules smaller, lanceolate and awl-shaped, less persistent; racemes panicled.*

6. **D. humifùsum,** Beck. *Glabrous or nearly so,* procumbent; *leaflets ovate or ovate-oblong,* rather obtuse, much smaller than in the two preceding (1¼ – 2′ long); corolla purple; pods 2 – 4-jointed, flat, the oval-rhomboid joints minutely scabrous throughout. — Dry sandy soil, S. Penn. to Md.

§ 3. *Pod slightly if at all stalked in the calyx; racemes panicled.*

* *Stems tall (3 – 5°) and erect; the persistent stipules and deciduous bracts large and conspicuous, ovate or ovate-lanceolate, taper-pointed; flowers rather large.*

+ *Pods of 4 – 7 unequal-sided rhombic joints, which are considerably longer than broad (about 6″ long).*

7. **D. canéscens,** DC. Stem loosely branched, *hairy; leaflets ovate, bluntish, about the length of the petioles, whitish and reticulated beneath,* both sides roughish with a close fine pubescence; joints of the pod very adhesive. — Moist grounds, Mass. and Vt. to Minn. and southward, chiefly westward. Branches clothed with both minute and hooked, and longer, spreading, rather glutinous hairs. — Var. VILLOSÍSSIMUM, Torr. & Gray, has the panicle and upper part of the stem very villous, and leaflets oblong-ovate. — Mo.

8. **D. cuspidàtum,** Torr. & Gray. *Very smooth* except the panicle; stem straight; *leaflets lanceolate-ovate and taper-pointed,* green both sides, longer than the petiole (3 – 5′); joints of the pod rhomboid-oblong, smoothish. — Thickets, common. The conspicuous bracts and stipules ½′ long.

+ + *Pods of 3 – 5 oval joints (not over 3″ long).*

9. **D. Illinoénse,** Gray. Erect (3 – 5° high); stem and leaves with short rough pubescence; leaflets ovate-oblong or ovate-lanceolate (2 – 4′ long), obtuse, subcoriaceous, cinereous beneath, veins and veinlets prominent, strongly retic-

ulated, the lower leaflets nearly equalling the petiole; pods scarcely over 1′ long. sinuate on both margins (deeper below). — Dry ground, Ill. to Iowa and Kan.

* * *Stems (2 – 5° high) erect; stipules and bracts mostly deciduous, small and inconspicuous; joints of the pod 3 – 5, triangular or half-rhombic or very unequal-sided rhomboidal, longer than broad, 3″ or less in length; flowers middle-sized.*

10. **D. lævigàtum,** DC. *Smooth* or nearly so throughout; stem straight; *leaflets ovate,* bluntish, pale beneath (2 – 3′ long); panicles minutely rough-pubescent. — Pine woods, N. J. to Fla., west to Mo. and Tex.

11. **D. viridiflòrum,** Beck. Stem *very downy,* rough at the summit; *leaflets broadly ovate,* very obtuse, rough above, *whitened with a soft velvety down underneath* (2 – 3′ long). — Southern N. Y. to N. J. and Fla., west to Mich., Mo., and Tex.

12. **D. Dillènii,** Darlingt. Stem pubescent; *leaflets oblong or oblong-ovate,* commonly bluntish, pale beneath, *softly and finely pubescent,* mostly thin (2 – 3′ long). — Open woodlands, common.

13. **D. paniculàtum,** DC. *Nearly smooth* throughout; stem slender, tall; *leaflets oblong-lanceolate, or narrowly lanceolate, tapering to a blunt point, thin* (3 – 5′ long); racemes much panicled. — Copses, common.

14. **D. stríctum,** DC. Stem very straight and slender, simple (2 – 3° high), the upper part and narrow panicle rough-glandular; *leaflets linear, blunt, strongly reticulated, thickish, very smooth* (1 – 2′ long, ¼′ wide); joints of the pod 1 – 3, semi-obovate or very gibbous (only 2″ long). — Pine woods, N. J. to Fla. and La.

* * * *Stipules small and inconspicuous, mostly deciduous; pods of few roundish or obliquely oval or sometimes roundish-rhomboidal joints, 1½ – 2½″ long.*

+– *Stems erect; bracts before flowering conspicuous; racemes densely flowered.*

15. **D. Canadénse,** DC. Stem hairy (3 – 6° high); *leaflets oblong-lanceolate* or ovate-lanceolate, obtuse, with numerous straightish veins, *much longer than the petiole* (1½ – 3′ long); *flowers showy,* larger than in any other species (½ – ⅓′ long). — Dry rich woods, N. Brunswick to N. C., Minn., and Kan.

16. **D. sessilifòlium,** Torr. & Gray. Stem pubescent (2 – 4° high); *leaves nearly sessile; leaflets linear* or linear-oblong, blunt, thickish, reticulated, rough above, downy beneath; branches of the panicle long; *flowers small.* — Copses, Penn. and Ky., west to Mich., Iowa, Mo., and Tex.

+– +– *Stems ascending (1 – 3° high); bracts small; racemes or panicles elongated and loosely flowered; flowers small.*

17. **D. rígidum,** DC. Stem branching, *somewhat hoary,* like the lower surface of the leaves, with a close roughish pubescence; *leaflets ovate-oblong,* blunt, thickish, reticulated-veiny, rather rough above, *the lateral ones longer than the petiole.* — Dry hillsides, Mass. to Fla., west to Mich., Mo., and La.

18. **D. ciliàre,** DC. Stem slender, *hairy or rough-pubescent; leaves crowded, on very short hairy petioles; leaflets round-ovate or oval,* thickish, more or less hairy on the margins and underneath (½ – 1′ long). — Dry hills and sandy fields, N. Eng. to Fla., west to Mich., Mo., and Tex.

19. **D. Marilándicum,** F. Boott. *Nearly smooth* throughout, slender; *leaflets ovate or roundish,* very obtuse, thin, *the lateral ones about the length of*

*the slender petiole;* otherwise resembling the preceding. — Copses, N. Eng. to Fla., west to Mich., Mo., and La.

+- +- +- *Stems reclining or prostrate; racemes loosely flowered.*

20. **D. lineàtum,** DC. Stem minutely pubescent, striate-angled; leaflets orbicular, smoothish (½ – 1′ long), much longer than the petiole; pod scarcely stalked in the calyx. — Dry soil, Md. and Va. to Fla. and La.

### 28. LESPEDÈZA, Michx. Bush-Clover.

Calyx 5-cleft; the lobes nearly equal, slender. Stamens diadelphous (9 and 1); anthers all alike. Pods of a single 1-seeded joint (sometimes 2-jointed, with the lower joint empty and stalk-like), oval or roundish, flat, reticulated. — Herbs with pinnately 3-foliolate leaves, not stipellate. Flowers often polygamous, in summer and autumn. (Dedicated to *Lespedez,* the Spanish governor of Florida in the time of Michaux.)

§ 1. *Stipules subulate-setaceous; bracts minute; calyx-lobes attenuate; perennial.*

* *Flowers of two sorts, the larger (violet-purple) perfect, but seldom fruitful, panicled or clustered; with smaller pistillate and fertile but mostly apetalous ones intermixed or in small subsessile clusters; calyx* 1 – 2″ *long; pod exserted.*

1. **L. procúmbens,** Michx. *Slender, trailing and prostrate,* minutely appressed-hairy to soft-downy; leaflets oval or obovate-elliptical, 3 – 9″ long; *peduncles very slender, few-flowered;* keel equalling the wings; pod small, roundish, obtuse or acute. (Incl. L. repens, *Bart.*) — Dry sandy soil; common.

2. **L. violàcea,** Pers. *Stems upright* or spreading, slender, branched, rather *sparsely leafy* and sparingly pubescent; *leaflets thin, broadly oval or oblong,* finely appressed-pubescent beneath; *peduncles very slender, loosely few-flowered,* mostly longer than the leaves; flowers 3 – 4″ long, the keel often the longest; *pod ovate,* 2 – 3″ long, nearly glabrous. — Dry copses, N. Eng. to Minn. and E. Kan., south to Fla. and La.

3. **L. reticulàta,** Pers. Stouter, *erect, very leafy; leaflets thickish, linear to linear-oblong,* 6 – 15″ long, finely appressed-pubescent; *flowers* (scarcely 3″ long) *clustered on peduncles much shorter than the leaves,* the keel shorter than the standard; *pods ovate, acute,* 2″ long, appressed-subpubescent. (L. violacea, var. angustifolia, *Torr. & Gray.*) — Mass. to Minn., and southward.

4. **L. Stùvei,** Nutt. *Stems* upright-spreading, *very leafy,* simple or somewhat branched, *downy with spreading pubescence; leaflets oval or roundish* varying to oblong or rarely linear-oblong, *silky or white-woolly beneath* and sometimes above; flowers as in the last, often numerous and crowded; *pods ovate, acuminate,* mostly 3″ long, *downy.* — Mass. to Mich., and south to Va. and Tex.

Var. **intermèdia,** Watson. Pubescence more scanty and usually fine and appressed as in n. 3, but the leaflets oval to oblong; inflorescence often more open; pod of n. 4 or of n. 3. (L. violacea, var. sessiliflora, of *Man.,* mainly.) — Mass. to Fla., and west to Mich., Ill., E. Kan., and Ark.

* * *Flowers all alike and perfect, in close spikes or heads; corolla whitish or cream-color with a purple spot on the standard, about the length of the downy 5-parted calyx; pod included; stems upright, wand-like* (2 – 4° *high*).

5. **L. polystàchya,** Michx. Stem with mostly spreading pubescence; *petioles* 2 – 6″ *long; leaflets from orbicular to oblong-ovate,* hairy; *spikes oblong,*

*on elongated peduncles; pod* (at maturity) oblong-ovate, pubescent, nearly 3″ long, *hardly shorter than the calyx.* (L. hirta, *Ell.*) — Dry hills, common.

6. **L. capitàta,** Michx. *Stems rigid, woolly; petioles very short; leaflets oblong to narrowly oblong,* thickish, reticulated and mostly smooth above, silky or sometimes downy beneath; *heads of flowers globular, on peduncles shorter than the leaves; pod oblong-ovate, pubescent, much shorter than the calyx.* — Dry and sandy soil, N. Eng. to Fla., west to Minn., Mo., and La.

7. **L. angustifòlia,** Ell. Like the last, but mostly appressed-silky, the *leaflets linear, the smaller often oblong heads on distinct and sometimes slender peduncles, the pod round-ovate,* acutish, 1½ – 2″ long, *hardly shorter than the calyx.* (L. capitata, var. angustifolia, *Pursh.*) — N. J. to Fla., west to Mich., Iowa, and La.

8. **L. leptostàchya,** Gray. Clothed with appressed silky pubescence; stems often branched, slender; *leaflets linear* to narrowly oblong; *spikes slender, somewhat loosely-flowered,* on peduncles as long as the leaves; *pod ovate, small* (1½″ long), *about equalling the calyx,* densely pubescent. — Ill., Iowa, and Minn.

§ 2. *Stipules and bracts broad and scarious; calyx-lobes broad; annual.*

**L.** STRIÀTA, Hook. & Arn. Diffusely branched, decumbent, subpubescent; petioles very short; leaflets oblong-obovate, 6″ long or less; peduncles very short, 1 – 5-flowered; pod small, little exceeding the calyx. — Common in the Southern States, extending into Mo. (Nat. from E. Asia.)

## 29. STYLOSÁNTHES, Swartz.

Calyx early deciduous; tube slender and stalk-like; limb unequally 4 – 5-cleft, the lower lobe more distinct. Corolla and monadelphous stamens inserted at the summit of the calyx-tube; standard orbicular; keel incurved. Anthers 10, the 5 longer ones fixed near their base, and the 5 alternate shorter ones fixed by the middle. Style filiform, its upper part falling off after flowering, the lower part incurved or hooked, persistent on the 1 – 2-jointed small and short reticulated pod; the lower joint when present empty and stalk-like. — Low perennials, branched from the base, with wiry stems, pinnately 3-foliolate leaves, the sheathing stipules united to the petiole, no stipels, and small, yellow flowers in terminal heads or short spikes. (Name composed of στύλος, *a column,* and ἄνθος, *a flower,* from the stalk-like calyx-tube.)

1. **S. elàtior,** Swartz. Tufted; leaflets lanceolate, strongly straight-veined; heads or clusters small and few-flowered. — Pine barrens, Long Island and N. J. to Fla., west to S. Ind., Kan., and Ark.

## 30. VÍCIA, Tourn. VETCH. TARE.

Calyx 5-cleft or 5-toothed, the 2 upper teeth often shorter, or the lowest longer. Wings of the corolla adhering to the middle of the keel. Stamens more or less diadelphous (9 and 1); the orifice of the tube oblique. Style filiform, hairy all round or only on the back at the apex. Pod flat, 2-valved, 2 – several-seeded. Seeds globular. Cotyledons very thick, remaining under ground in germination. — Herbs, mostly climbing more or less by the tendril at the end of the pinnate leaves. Stipules half-sagittate. Flowers or peduncles axillary. (The classical Latin name.)

* *Annual; flowers* 1 *or* 2 *in the axils, nearly sessile, large, violet-purple.*

**V.** SATÌVA, L. (COMMON VETCH or TARE.) Somewhat pubescent; stem simple; leaflets 5 – 7 pairs, varying from obovate-oblong to linear, notched and mucronate at the apex; pod linear, several-seeded. — Cultivated fields and waste places, N. Eng. to N. J. and southward, west to Mich. and Minn. — Var. ANGUSTIFÒLIA, Seringe, has longer and narrow leaflets. (Adv. from Eu.)

* * *Annual, slender; peduncles elongated; flowers small.*

**V.** TETRASPÉRMA, L. *Peduncles* 1 – 2-*flowered;* leaflets 4 – 6 pairs, linear-oblong, obtuse; calyx-teeth unequal; corolla whitish; *pods narrow,* 4-*seeded, smooth.* — Waste places, near the coast, N. Scotia to N. J. (Nat. from Eu.)

**V.** HIRSÙTA, Koch. *Peduncles* 3 – 6-*flowered;* leaflets 6 – 8 pairs, truncate; calyx-teeth equal; corolla bluish; *pods oblong,* 2-*seeded, hairy.* — N. Brunswick to Mass. and Va. (Nat. from Eu.)

* * * *Perennial; peduncles elongated; calyx-teeth unequal; pod several-seeded.*

1. **V. Crácca,** L. Downy-pubescent; *leaflets* 20 – 24, *oblong-lanceolate, strongly mucronate; spikes densely many-flowered,* 1-sided; flowers blue, turning purple, 6″ long, reflexed; calyx-teeth shorter than the tube. — Borders of thickets, Newf. to N. J., west to Ky., Iowa, and Minn. (Eu.)

2. **V. Caroliniàna,** Walt. Nearly smooth; *leaflets* 8 – 24, *oblong, obtuse, scarcely mucronate; peduncles loosely-flowered;* flowers small, more scattered than in the preceding, whitish, the keel tipped with blue; calyx-teeth very short. — River-banks, Ont. and N. Y. to Ga., west to Minn. and Kan.

3. **V. Americàna,** Muhl. Glabrous; *leaflets* 10 – 14, *elliptical or ovate-oblong,* very obtuse, many-veined; *peduncles* 4 – 8-*flowered;* flowers purplish (8″ long). — Moist soil, N. Y. and N. J., to Kan., Minn., and westward. — Var. LINEÀRIS, Watson, a low form with linear leaflets, occurs in Kan. and Neb., and is common westward.

## 31. LÁTHYRUS, Tourn. VETCHLING. EVERLASTING PEA.

Style flattish, dilated and flattish (not grooved) above, hairy along the inner side (next the free stamen). Sheath of the filaments scarcely oblique at the apex. Otherwise nearly as in Vicia. — Our species are perennial and mostly smooth plants, the rhachis of the leaves in some not produced into a tendril. (*Λάθυρος,* a leguminous plant of Theophrastus.)

* *Tendrils present; stipules large and broad; leaflets* 3 – 5 *pairs.*

1. **L. marítimus,** Bigelow. (BEACH PEA.) Stout (1° high or more); *stipules broadly ovate and halberd-shaped, nearly as large as the leaflets,* the lower lobe larger and usually coarsely toothed; leaflets *thick,* ovate-oblong (1 – 2′ long); peduncles a little shorter than the leaves, 6 – 10-flowered, *flowers large* (9″ long), *purple.* — Seashore from N. J. and Oregon to the Arctic Sea; also on the Great Lakes. (Eu.)

2. **L. ochroleùcus,** Hook. Stem slender (1 – 3° high); *stipules semi-cordate, half as large as the thin ovate leaflets;* peduncles 7 – 10-flowered; *flowers smaller, yellowish-white.* — Hillsides, N. Eng. to Minn., Iowa, and westward.

* * *Tendrils present; stipules narrow, semi-sagittate, acuminate.*

+ *Flowers purple; leaflets several pairs.*

3. **L. venòsus,** Muhl. *Stout,* climbing, usually somewhat downy; stipules very small and mostly slender; *leaflets* 4 – 6 *pairs, oblong ovate,* mostly

obtuse (about 2′ long); *peduncles many-flowered;* flowers 6 – 8″ long. — Shady banks, Penn. to Ga., west to Kan. and Minn.

4. **L. palústris,** L. *Slender,* glabrous or somewhat pubescent; stem often winged; stipules lanceolate, sharp-pointed at both ends; *leaflets 2 – 4 pairs, narrowly oblong to linear, acute* (1 – 2′ long); *peduncles 2 – 6-flowered;* flowers 6″ long. — Moist places, N. Scotia to N. J., and westward across the continent. (Eu.)

Var. **myrtifòlius,** Gray. Stipules usually broader and larger; leaflets ovate to oblong (1′ long or less). — Same range, and extending south to N. C.

+ + *Flowers yellow; leaflets a single pair.*

**L.** PRATÉNSIS, L. Low and straggling; leaflets narrowly lanceolate to linear, acute; peduncles several-flowered. — Spontaneous in Mass., N. Y., and Ont. (Nat. from Eu.)

* * * *Tendrils usually wanting; low, mostly erect; stipules semi-sagittate; flowers very large, purple; pod stipitate in the calyx.*

5. **L. polymórphus,** Nutt. Leaflets 3 – 6 pairs, narrowly oblong to linear, thick and strongly nerved, 1 – 2′ long; seeds with a narrow footstalk and short hilum. — Mo., Kan., and westward.

6. **L. ornàtus,** Nutt. Like the last, but leaflets always narrow, 3 – 12″ long; seeds with a very broad footstalk and long hilum. — Kan. to Col. and Dak. Scarcely 1° high.

## 32. ÁPIOS, Boerhaave. GROUND-NUT. WILD BEAN.

Calyx somewhat 2-lipped, the 2 lateral teeth being nearly obsolete, the upper very short, the lower one longest. Standard very broad, reflexed; the long scythe-shaped keel strongly incurved, at length coiled. Stamens diadelphous. Pod straight or slightly curved, linear, elongated, thickish, many-seeded. — A perennial herb (with some milky juice!), twining and climbing over bushes, and bearing edible tubers on underground shoots. Leaflets 3 – 7, ovate-lanceolate, obscurely stipellate. Flowers in dense and short, often branching racemes. (Name from ἄπιον, *a pear,* from the shape of the tubers.)

1. **A. tuberòsa,** Moench. Flowers brown-purple or chocolate-color, violet-scented. — Low grounds, N. Brunswick to Fla., west to Minn., Kan., and La.

## 33. PHASÈOLUS, Tourn. KIDNEY BEAN.

Calyx 5-toothed or 5-cleft, the two upper teeth often higher united. Keel of the corolla, with the included stamens and style, spirally coiled. Stamens diadelphous. Style bearded along the upper side; stigma oblique or lateral. Pod scythe-shaped, several – many-seeded, tipped with the hardened base of the style. Seeds round-reniform, with very short hilum. Cotyledons thick and fleshy, rising out of the ground nearly unchanged in germination. — Twining herbs, with pinnately 3-foliolate stipellate leaves. Flowers racemose, produced in summer and autumn. (The ancient name of the Kidney Bean.)

1. **P. perénnis,** Walt. (WILD BEAN.) Stem climbing high from a perennial root; leaflets roundish-ovate, short-pointed; flowers purple, handsome, but small; pods drooping, strongly curved, 4 – 5-seeded. — Copses, N. Eng. to Fla., west to Minn. and La.

## 34. STROPHOSTỲLES, Ell.

Keel of the corolla with the included stamens and style elongated, strongly incurved, not spirally coiled. Pod linear, terete or flattish, straight or nearly so. Seeds quadrate or oblong with truncate ends, mealy-pubescent or glabrate; hilum linear. Flowers few, sessile and capitate-clustered on the mostly long peduncles. Otherwise as Phaseolus. — Stems prostrate or climbing, more or less retrorsely hairy. Stipules and bracts striate. (Name from *στροφή, a turning*, and *στῦλος, a style.*)

1. **S. angulòsa,** Ell. *Annual;* stems branched, 1 – 6° long; leaflets ovate to oblong-ovate (rarely linear-oblong), *with a more or less prominent rounded lobe toward the base* (*the terminal 2-lobed*), or some or all often entire, about 1′ (6 – 20″) long; corolla greenish-white and purplish; pod terete, 2 – 3′ long by 3″ wide, 4 – 8-seeded, nearly glabrous; *seeds oblong, about 3″ long*, usually very pubescent. (Phaseolus diversifolius, *Pers.* P. helvolus, *L.*) — Sandy shores and river-banks; coast of Mass. and southward, along the Great Lakes to Minn., and south to Kan. and Tex.

Var. **Missouriénsis,** Watson in herb. Climbing high (10 – 30°); leaves often 3′ long, rhombic-ovate, rarely at all lobed; seeds 3 – 4″ long. — River-bottoms near Independence, Mo.; nearly two months later. (*F. Bush.*)

2. **S. pedunculàris,** Ell. Stems *more slender*, from a *perennial* rootstock, 2 – 4° long; leaflets ovate to oblong-linear, *rarely at all lobed*, 1′ long or less; pod 1½ – 2′ long and *scarcely 2″ wide;* seeds *much smaller*, 1½ – 2″ long, short-oblong to quadrate. (Phaseolus helvolus, *Man.*, etc.; not *L.*) — Sandy ground, Long Island and N. J. to Fla., west to S. Ind., Ky., and La.

3. **S. pauciflòrus,** Watson in herb. *Annual*, slender, low-climbing, pubescent; leaflets oblong-lanceolate or ovate-oblong to linear, not lobed, 1′ long; pod pubescent, 1′ long, flattish; seeds as in the last, very finely mealy, soon glabrate. (Phaseolus pauciflorus, *Benth.*) — River-banks, Ind. to Minn., south to Miss. and Tex.

## 35. CENTROSÈMA, DC. Spurred Butterfly-Pea.

Calyx short, 5-cleft. Corolla, etc., much as in Clitoria, but the spreading standard with a spur-shaped projection on the back near the base; keel broad. Style bearded at the apex around the terminal stigma. Pod long and linear, flat, pointed with the awl-shaped style, many-seeded, thickened at the edges, the valves marked with a raised line on each side next the margin. — Twining perennials, with 3-foliolate stipellate leaves, and large showy flowers. Stipules, bracts, and bractlets striate, the latter longer than the calyx. (Name from *κέντρον, a spur*, and *σῆμα, a standard.*)

1. **C. Virginiànum,** Benth. Rather rough with minute hairs; leaflets varying from oblong-ovate to lanceolate and linear, very veiny, shining; peduncles 1 – 4-flowered; calyx-teeth linear-awl-shaped; corolla violet, 1′ long; pods straight, 4 – 5′ long. — Sandy woods, Md. to Fla. and Ark. (Trop. Am.)

## 36. CLITÒRIA, L. Butterfly-Pea.

Calyx tubular, 5-toothed. Standard much larger than the rest of the flower, erect, rounded, notched at the top, not spurred on the back; keel small, shorter than the wings, incurved, acute. Stamens monadelphous below. Style bearded down the inner face. Pod linear-oblong, flattish, knotty, several-seeded, pointed with the base of the style. — Erect or twining perennials, with mostly pinnately 3-foliolate stipellate leaves, and very large flowers. Peduncles 1–3-flowered; bractlets opposite, striate. (Derivation recondite.)

1. **C. Mariàna,** L. Low, ascending or twining, smooth; leaflets oblong-ovate or ovate-lanceolate; stipules and bracts awl-shaped; peduncles short; the showy pale-blue flowers 2′ long. — Dry banks, N. Y. to Va. and Fla., west to Mo. and Tex.

## 37. AMPHICARPÆ̀A, Ell. Hog Pea-nut.

Flowers of 2 kinds; those of the racemes from the upper branches perfect, but seldom ripening fruit; those near the base and on filiform creeping branches with the corolla none or rudimentary, and few free stamens, but fruitful. Calyx about equally 4- (rarely 5-) toothed; bractlets none or minute. Keel and wing-petals similar, almost straight; the standard partly folded round them. Stamens diadelphous. Style beardless. Pods of the upper flowers, when formed, somewhat scymetar-shaped, stipitate, 3–4-seeded; of the lower ones commonly subterranean and fleshy, obovate or pear-shaped, ripening usually but one large seed. — Low and slender perennials; the twining stems clothed with brownish hairs. Leaves pinnately 3-foliolate; leaflets rhombic-ovate, stipellate. Flowers in simple or compound racemes, purplish. Bracts persistent, round, partly clasping, striate, as well as the stipules. (Name from ἀμφί, *both,* and καρπός, *fruit,* in allusion to the two kinds of pods.)

1. **A. monòica,** Nutt. Leaflets thin, ½–2′ long; racemes nodding; calyx of upper flowers 2″ long, the ovary glabrous except the hairy margin; pod 1′ long; ovary and pod of the rudimentary flowers hairy. — Rich damp woodlands, common. Aug., Sept.

2. **A. Pítcheri,** Torr. & Gray. Leaflets usually 2–4′ long; rhachis of the racemes usually villous; calyx 3″ long, the teeth acuminate; ovary hairy. — Western N. Y. to Ill., Mo., La., and Tex. The upper flowers more commonly fertile; apparently producing subterranean fruit but rarely.

## 38. GALÁCTIA, P. Browne. Milk-Pea.

Calyx 4-cleft; the lobes acute, the upper one broadest, entire. Keel scarcely incurved. Stamens diadelphous or nearly so. Style beardless. Pod linear, flat, several-seeded (some few of them rarely partly subterranean and fleshy or deformed). — Low, mostly prostrate or twining perennial herbs. Leaflets usually 3, stipellate. Flowers in somewhat interrupted or knotty racemes, purplish; in summer. (Name from γάλα, -ακτος, *milk;* some species being said to yield a milky juice, which is unlikely.)

1. **G. glabélla,** Michx. *Stems nearly smooth,* prostrate; leaflets elliptical or ovate-oblong, sometimes slightly hairy beneath; racemes short, 4–8-flowered; *pods somewhat hairy.* — Sandy woods, southern N. Y. to Va., Fla., and Miss.

2. **G. pilòsa,** Ell. *Stems* (decumbent and somewhat twining) and *leaves beneath soft-downy and hoary;* leaflets oval; racemes many-flowered, *pods very downy.* (G. mollis, *Gray,* Manual; not *Michx.*) — Penn. to Fla. and Miss.

### 39. RHYNCHÒSIA, Lour.

Calyx somewhat 2-lipped, or deeply 4–5-parted. Keel scythe-shaped, or incurved at the apex. Stamens diadelphous. Ovules only 2. Pod 1–2-seeded, short and flat, 2-valved. — Usually twining or trailing perennial herbs, pinnately 3-foliolate, or with a single leaflet, not stipellate. Flowers yellow, racemose or clustered. (Name from ῥύγχος, *a beak*, from the shape of the keel.)

1. **R. tomentòsa,** Hook. & Arn. *Trailing and twining*, the stem and leaves more or less *pubescent with spreading hairs;* leaflets 3, *roundish or round-rhombic*, acute or acutish; *racemes* few-flowered, almost *sessile in the axils;* calyx about as long as the corolla, 4-parted, the upper lobe 2-cleft; pod oblong. (R. tomentosa, var. volubilis, *Torr. & Gray.*) — Dry soil, Va. to Fla. and Tex.

2. **R. erécta,** DC. *Erect*, 1–2° high; stem and leaves *more or less tomentose; leaflets* 3, *oval to oblong*, obtuse or acutish; racemes short and shortly peduneulate. (R. tomentosa, var. erecta, *Torr. & Gray.*) — Del. to Fla. and Miss.

3. **R. renifórmis,** DC. *Dwarf and upright*, 3–8′ high; *pubescence spreading; leaflets solitary* (rarely 3), *round-reniform*, very obtuse or apiculate; racemes few-flowered, sessile in the axils. (R. tomentosa, var. monophylla, *Torr. & Gray.*) — Va. to Fla. and Miss.

### 40. CÉRCIS, L. Red-bud. Judas-tree.

Calyx 5-toothed. Corolla imperfectly papilionaceous; standard smaller than the wings, and enclosed by them in the bud; the keel-petals larger and not united. Stamens 10, distinct, declined. Pod oblong, flat, many-seeded, the upper suture with a winged margin. Embryo straight. — Trees, with rounded heart-shaped simple leaves, caducous stipules, and red-purple flowers in umbel-like clusters along the branches of the last or preceding years, appearing before the leaves, acid to the taste. (The ancient name of the Oriental *Judas-tree.*)

1. **C. Canadénsis,** L. (Red-bud.) Leaves pointed; pods nearly sessile above the calyx. — Rich soil, N. Y. and N. J. to Fla., west to S. Minn., Kan., and La. A small ornamental tree, often cultivated.

### 41. CÁSSIA, Tourn. Senna.

Sepals 5, scarcely united at base. Petals 5, little unequal, spreading. Stamens 5–10, unequal, and some of them often imperfect, spreading; anthers opening by 2 pores or chinks at the apex. Pod many-seeded, often with cross partitions. — Herbs (in the United States), with simply and abruptly pinnate leaves, and mostly yellow flowers. (An ancient name of obscure derivation.)

* *Leaflets large; stipules deciduous; the three upper anthers deformed and imperfect; flowers in short axillary racemes, the upper ones panicled; herbage glabrous.*

1. **C. Marilándica,** L. (Wild Senna.) Stem 3–4° high; *leaflets* 6–9 *pairs, lanceolate-oblong, obtuse;* petiole with a club-shaped gland near the base; pods linear, slightly curved, flat, at first hairy (2–4′ long); root perennial. — Alluvial soil, N. Eng. to Fla., west to Mich., S. E. Neb., Kan., and La.

2. **C. Tòra,** L. Annual; *leaflets* 3 *or rarely* 2 *pairs, obovate, obtuse,* with an elongated gland between those of the lower pairs or lowest pair; pods slen-

der, 6′ long, curved. (C. obtusifolia, *L.*) — River-banks, S. Va. to Fla., west to S. Ind., Mo., and Ark.

C. OCCIDENTÀLIS, L. Annual; *leaflets* 4 – 6 *pairs, ovate-lanceolate, acute;* an ovate gland at the base of the petiole; pods long-linear (5′ long) with a tumid border, glabrous. — Va., S. Ind., and southward. (Adv. from Trop. Amer.)

* * *Leaflets small, somewhat sensitive to the touch; stipules striate, persistent; a cup-shaped gland beneath the lowest pair of leaflets; anthers all perfect; flowers in small clusters above the axils; pods flat; root annual.*

3. **C. Chamæcrísta,** L. (PARTRIDGE PEA.) Stems spreading (1° long); leaflets 10 – 15 pairs, linear-oblong, oblique at the base; *flowers* (*large*) *on slender pedicels,* 2 or 3 of the showy yellow petals often with a purple spot at base; *anthers* 10, *elongated, unequal* (4 of them yellow, the others purple); style slender. — Sandy fields; common, especially southward.

4. **C. níctitans,** L. (WILD SENSITIVE-PLANT.) Leaflets 10 – 20 pairs, oblong-linear; *flowers* (*very small*) *on very short pedicels; anthers* 5, *nearly equal;* style short. — Sandy fields, N. Eng. to Fla., west to Ind., Kan., and La.

## 42. HOFFMANSÉGGIA, Cav.

Calyx 5-parted. Petals 5, nearly equal, oblong or oval. Stamens 10, distinct, slightly declined; anthers dehiscing longitudinally. Pod flat, oblong, often falcate, few – several-seeded. — Low perennial herbs, or woody at base, punctate with black glands, with bipinnate leaves, and naked racemes of yellow flowers opposite the leaves or terminal. (Named for *Count von Hoffmansegg,* a German botanist.)

1. **H. Jamèsii,** Torr. & Gray. Herbaceous, finely pubescent; pinnæ 2 or 3 pairs with an odd one, the small oblong leaflets 5 – 9 pairs; pods broad, falcate, 1′ long, 2 – 3-seeded. — Central Kan. to Tex., Ariz., and Mex.

## 43. GYMNÓCLADUS, Lam. KENTUCKY COFFEE-TREE.

Flowers diœcious or polygamous, regular. Calyx elongated-tubular below, 5-cleft. Petals 5, oblong, equal, inserted on the summit of the calyx-tube. Stamens 10, distinct, short, inserted with the petals. Pod oblong, flattened, hard, pulpy inside, several-seeded. Seeds flattish. — A large tall tree, with rough bark, stout branchlets, not thorny, and large unequally twice-pinnate leaves; the leaflets standing vertically. — Flowers whitish, in terminal racemes. (Name from γυμνός, *naked,* and κλάδος, *a branch,* alluding to the stout branches destitute of spray.)

1. **G. Canadénsis,** Lam. Leaves 2 – 3° long, with several large partial leafstalks bearing 7 – 13 ovate stalked leaflets, the lowest pair with single leaflets; stipules wanting; pod 6 – 10′ long, 2′ broad; the seeds over ½′ across. — Rich woods, western N. Y. and Penn. to Minn., E. Neb., and Ark.

## 44. GLEDÍTSCHIA, L. HONEY-LOCUST.

Flowers polygamous. Calyx short, 3 – 5-cleft, the lobes spreading. Petals as many as the sepals and equalling them, the 2 lower sometimes united. Stamens 3 – 10, distinct, inserted with the petals on the base of the calyx. Pod flat, 1 – many-seeded. Seeds flat. — Thorny trees, with abruptly once or twice pinnate leaves, and inconspicuous greenish flowers in small spikes. Thorns above the axils. (Named in honor of *J. G. Gleditsch*, a botanist contemporary with Linnæus.)

1. **G. triacánthos,** L. (THREE-THORNED ACACIA, or HONEY-LOCUST.) Thorns stout, often triple or compound; *leaflets lanceolate-oblong*, somewhat serrate; *pods linear, elongated* (1 – 1½° long), often twisted, filled with sweet pulp between the seeds. — Rich woods, western N. Y. and Penn. to Ga., west to Mich., E. Neb., Kan., and La. A large tree, common in cultivation, with very hard and heavy wood.

2. **G. aquática,** Marsh. (WATER-LOCUST.) Thorns slender, mostly simple; *leaflets ovate or oblong; pods oval, 1-seeded*, pulpless. (G. monosperma, *Walt.*) — Deep swamps, Mo. to S. Ind., S. Car., and southward. A smaller tree, 30 – 40° high.

## 45. DESMÁNTHUS, Willd.

Flowers perfect or polygamous, regular. Calyx campanulate, 5-toothed. Petals 5, distinct. Stamens 5 or 10. Pod flat, membranaceous or somewhat coriaceous, several-seeded, 2-valved, smooth. — Herbs, with twice-pinnate leaves of numerous small leaflets, and with one or more glands on the petiole, setaceous stipules, and axillary peduncles bearing a head of small greenish-white flowers. (Name composed of *δέσμα, a bond*, and *ἄνθος, flower.*)

1. **D. brachýlobus,** Benth. Nearly glabrous perennial, erect (1 - 4° high); pinnæ 6 – 15 pairs; leaflets 20 – 30 pairs; peduncles 1 - 3′ long; stamens 5; pods *numerous in dense globose heads, oblong or lanceolate*, curved, scarcely 1′ long, 2 – 6-seeded. — Prairies and alluvial banks, Ind and Ky. to Minn., Mo., and Tex.; also in Fla.

2. **D. leptólobus,** Torr. & Gray. Pinnæ 5 - 8 pairs; leaflets 10 – 20 pairs; peduncles 1′ long or less; heads rather loose, stamens 5; *pods usually few, narrowly linear, erect*, 1 – 2′ long. — Central Kan. to Tex.

## 46. SCHRÁNKIA, Willd. SENSITIVE BRIAR.

Flowers polygamous, regular. Calyx minute, 5-toothed. Petals united into a funnel-form 5-cleft corolla. Stamens 10 – 12, distinct, or the filaments united at base. Pods long and narrow, rough-prickly, several-seeded, 4-valved, i. e., the two narrow valves separating on each side from a thickened margin — Perennial herbs, nearly related to the true Sensitive Plants (Mimosa); the procumbent stems and petioles recurved-prickly, with twice-pinnate sensitive leaves of many small leaflets, and axillary peduncles bearing round heads of small rose-colored flowers. (Named for *F. P. Schrank*, a German botanist.)

1. **S. uncinàta,** Willd. Prickles hooked; pinnæ 4 - 6 pairs; *leaflets elliptical, reticulated* with strong veins beneath; pods oblong-linear, nearly terete-short-pointed, densely prickly (2′ long). — Dry sandy soil, Va. to Fla., west to S. Ill., Kan., and Tex.

2. **S. angustàta,** Torr. & Gray. *Leaflets oblong-linear, scarcely veined;* pods slender, taper-pointed, sparingly prickly (about 4′ long). — S. Va. (?) to Fla., Tenn., and Tex.

## ORDER 33. ROSACEÆ. (ROSE FAMILY.)

*Plants with regular flowers, numerous (rarely few) distinct stamens inserted on the calyx, and 1–many pistils, which are quite distinct, or (in the last tribe) united and combined with the calyx-tube. Seeds (anatropous) 1–few in each ovary, almost always without albumen. Embryo straight, with large and thick cotyledons. Leaves alternate, with stipules,* these sometimes caducous, rarely obsolete or wanting. — Calyx of 5 or rarely 3–4–8 sepals (the odd one superior), united at the base, often appearing double by a row of bractlets outside. Petals as many as the sepals (rarely wanting), mostly imbricated in the bud, and inserted with the stamens on the edge of a disk that lines the calyx-tube. Trees, shrubs, or herbs. — A large and important order, almost destitute of noxious qualities, and producing the most valuable fruits. Very intimately connected with Leguminosæ on one hand, and with Saxifragaceæ on the other.

I. Ovary superior and not enclosed in the calyx-tube at maturity.

* Calyx deciduous, without bractlets; pistil solitary, becoming a drupe.

**Tribe I. PRUNEÆ.** Trees or shrubs, with simple mostly serrate leaves. Ovules 2, pendulous, but seed almost always solitary. Style terminal.

1. **Prunus.** Flowers perfect. Lobes of calyx and corolla 5. Stone of the drupe bony.

* * Calyx mostly persistent; pistils few to many (rarely solitary).

+ Calyx without bractlets; ovules 2-many.

**Tribe II. SPIRÆEÆ.** Pistils mostly 5, becoming 2-several-seeded follicles. Shrubs or perennial herbs.

*a.* Calyx short, 5-cleft. Petals obovate, equal.

2. **Spiræa.** Flowers perfect or diœcious. Pods 1-valved. Herbs or shrubs; leaves simple or pinnate.
3. **Physocarpus.** Pods inflated, 2-valved. Shrub: leaves palmately lobed.

*b.* Calyx elongated, 5-toothed. Petals slender, unequal.

4. **Gillenia.** Herbs; leaves 3-foliolate.

**Tribe III. RUBEÆ.** Pistils several or numerous, becoming drupelets in fruit. Ovules 2 and pendulous, but seed solitary. Perennials, herbaceous or with biennial soft-woody stems.

5. **Rubus.** Pistils numerous, fleshy in fruit, crowded upon a spongy receptacle.
6. **Dalibarda.** Pistils 5-10, in the bottom of the calyx, nearly dry in fruit.

+ + Calyx-lobes mostly with bractlets; ovule solitary.

**Tribe IV. POTENTILLEÆ.** Pistils few-many, 1-ovuled, becoming dry achenes. Herbs

*a.* Styles persistent and elongated after anthesis, often plumose or jointed.

7. **Geum.** Calyx-lobes usually with 5 alternating small bractlets. Stamens and carpels numerous; styles becoming plumose or hairy tails, or naked and straight or jointed.

*b.* Styles not elongated after anthesis, mostly deciduous.

8. **Waldsteinia.** Petals and calyx-lobes 5; small or no bractlets. Stamens numerous. Achenes 2-6; styles deciduous from the base.
9. **Fragaria.** Flower as in Potentilla. Receptacle much enlarged and pulpy in fruit.
10. **Potentilla.** Petals 5 (rarely 4), conspicuous. Calyx-lobes as many, with an alternating set of bractlets. Stamens and achenes numerous; the latter heaped on a dry receptacle. Styles commonly more or less lateral, deciduous or not enlarging in fruit.
11. **Sibbaldia.** Petals minute; stamens and achenes 5-10; otherwise as Potentilla.

II. Ovaries inferior or enclosed in the calyx-tube.

**Tribe V. POTERIEÆ.** Pistils 1 – 4, becoming achenes, completely enclosed in the dry and firm calyx-tube, which is constricted or nearly closed at the throat. Herbs with compound or lobed leaves. Petals often none.

12. **Alchemilla.** Calyx urceolate, bracteolate. Petals none. Stamens 1 – 4. Flowers minute, clustered.

13. **Agrimonia.** Calyx turbinate, with a margin of hooked prickles. Stamens 5 – 12. Flowers yellow, in long racemes.

14. **Poterium.** Calyx-lobes petaloid; tube 4-angled, naked Petals none. Flowers densely capitate or spicate.

**Tribe VI. ROSEÆ.** Pistils many, becoming bony achenes, enclosed in the globose or urn-shaped fleshy calyx-tube, which resembles a pome. Petals conspicuous. Stamens numerous.

15. **Rosa.** The only genus. Prickly shrubs with pinnate leaves.

**Tribe VII. POMEÆ.** Carpels 2 - 5, enclosed in and coalescent with the fleshy or berry-like calyx, in fruit becoming a 2 – several-celled pome. Trees or shrubs, with stipules free from the petiole.

*a.* Cells of the compound ovary as many as the styles (2 - 5), each 2- (rarely several-) ovuled.

16. **Pyrus.** Pome containing 2 – 5 papery or cartilaginous carpels.

17. **Cratægus.** Pome drupe-like, with 1 - 5 bony stones or kernels. Usually thorny.

*b.* Cells of the compound ovary becoming twice as many as the styles, each 1-ovuled.

18. **Amelanchier.** Pome usually of 5 carpels: each becomes incompletely 2-celled by a projection from its back; otherwise as Pyrus.

## 1. PRÙNUS, Tourn. Plum, Cherry, etc.

Calyx 5-cleft; the tube bell-shaped, urn-shaped or tubular-obconical, deciduous after flowering. Petals 5, spreading. Stamens 15 – 20. Pistil solitary, with 2 pendulous ovules. Drupe fleshy, with a bony stone. — Small trees or shrubs, with mostly edible fruit. (The ancient Latin name.)

§ 1. PRUNUS proper (and Cerasus). *Drupe smooth, and the stone smooth or somewhat rugged; flowers (usually white) from separate lateral scaly buds in early spring, preceding or coetaneous with the leaves; the pedicels few or several in simple umbel-like clusters.*

1. **P. Americàna,** Marshall. (Wild Yellow or Red Plum.) Tree thorny, 8 – 20° high; *leaves ovate* or somewhat obovate, *conspicuously pointed, coarsely or doubly serrate, very veiny, glabrous when mature;* fruit nearly destitute of bloom, roundish-oval, yellow, orange, or red, ½ – ⅚′ in diameter, with the turgid stone more or less acute on both margins, or in cultivated states 1′ or more in diameter, the flattened stone with broader margins; pleasant-tasted, but with a tough and acerb skin. — Woodlands and river-banks, common.

2. **P. marítima,** Wang. (Beach Plum.) Low and straggling (1 – 5°); *leaves ovate or oval, finely serrate, softly pubescent underneath;* pedicels short, pubescent; fruit globular, purple or crimson with a bloom (½ – 1′ in diameter); the stone very turgid, *acute on one edge,* rounded and minutely grooved on the other. — Sea-beaches and the vicinity, N. Brunswick to Va. It varies, when at some distance from the coast (N. J. and southward), with the leaves smoother and thinner and the fruit smaller.

3. **P. Alleghaniénsis,** Porter. A low straggling shrub or small tree (3 – 15° high), seldom thorny; *leaves lanceolate to oblong-ovate, often long-acu-*

*minate, finely and sharply serrate,* softly pubescent when young, glabrate with age; *fruit globose-ovoid, very dark purple with a bloom* (less than ½′ in diameter); stone turgid, a shallow groove on one side and a broad flat ridge on the other. — Bluffs of the Alleghany Mts., Penn.

4. **P. Chicàsa,** Michx. (CHICKASAW PLUM.) Stem scarcely thorny (8 – 15° high); *leaves nearly lanceolate, finely serrulate, glabrous;* fruit globular, *red, nearly destitute of bloom* (½ – ⅔′ in diameter); the ovoid stone almost as thick as wide, rounded at both sutures, one of them minutely grooved. — Md. to Fla., west to S. Ind., Kan., and Tex.

5. **P. grácilis,** Engelm. & Gray. *Soft-pubescent,* 1 – 4° high; *leaves oblong-lanceolate to ovate, acute, sharply serrate,* becoming nearly glabrous above, 1 – 2′ long; *pedicels and calyx pubescent;* fruit less than ½′ in diameter; stone rather turgid, suborbicular. — Prairies and sandy places, S. Kan. to Tex. and Tenn.

6. **P. pùmila,** L. (DWARF CHERRY. SAND C.) Smooth, depressed and trailing (6′ – 6° high); *leaves obovate-lanceolate, tapering to the base,* somewhat toothed near the apex, *pale underneath;* flowers 2 – 4 together; fruit ovoid, dark red or nearly black when ripe, without bloom; stone ovoid, marginless, of the size of a large pea. — Rocks or sandy banks, N. Brunswick to Va., west to Minn. and Kan. Fruit usually sour and astringent.

7. **P. Pennsylvánica,** L. f. (WILD RED CHERRY.) Tree 20 – 30° high, with light red-brown bark; *leaves oblong-lanceolate, pointed, finely and sharply serrate, shining, green and smooth both sides;* flowers many in a cluster, on long pedicels; fruit globose, light red, very small, with thin and sour flesh; stone globular. — Rocky woods, Newf. to N. C., west to Minn. and Mo.

**P.** SPINÒSA, L. (SLOE. BLACK THORN.) Branches thorny; *leaves obovate-oblong or ovate-lanceolate, sharply serrate, at length glabrous;* pedicels glabrous; fruit small, globular, black with a bloom, the stone turgid, acute on one edge. — Var. INSITÍTIA (BULLACE-PLUM), is less spiny, the pedicels and lower side of the leaves pubescent. — Roadsides and waste places, N. Eng. to Penn. and N. J. (Adv. from Eu.)

§ 2. PADUS. *Drupe small, globose, without bloom; the stone turgid-ovate, marginless; flowers in racemes terminating leafy branches, therefore appearing after the leaves, late in spring.*

8. **P. Virginiàna,** L. (CHOKE-CHERRY.) A tall shrub, with grayish bark; *leaves oval, oblong, or obovate, abruptly pointed, very sharply (often doubly) serrate with slender teeth,* thin; petals roundish; fruit red turning to dark crimson; stone smooth. — River-banks, Newf. to Ga., west to Minn., E. Neb., and Tex. — Fruit very austere and astringent. A variety with very short dense racemes and sweeter yellowish fruit has been found at Dedham, Mass.

9. **P. seròtina,** Ehrh. (WILD BLACK CHERRY.) A large tree, with reddish-brown branches; *leaves oblong or lanceolate-oblong, taper-pointed, serrate with incurved short and callous teeth,* thickish, shining above; racemes elongated; petals obovate; fruit purplish-black. — Woods, N. Scotia to Fla., west to Minn., E. Neb., and La. — Fruit slightly bitter, but with a pleasant vinous flavor.

10. **P. demíssa,** Walp. Low but tree-like in habit, 3 – 12° high, resembling n. 8 in foliage, but the leaves rather thick and the teeth less slender; racemes often elongated; fruit purplish-black, sweet and but slightly astringent. — Central Kan. and Neb. to New Mex., Dak., and westward.

## 2. SPIRÆA, L. MEADOW-SWEET.

Calyx 5-cleft, short, persistent. Petals 5, obovate, equal, imbricated in the bud. Stamens 10 – 50. Pods (follicles) 5 – 8, not inflated, few – several-seeded. Seeds linear, with a thin or loose coat and no albumen. — Shrubs or perennial herbs, with simple or pinnate leaves, and white or rose-colored flowers in corymbs or panicles. (The Greek name, from σπειράω, *to twist*, from the twisting of the pods in the original species.)

§ 1. SPIRÆA proper. *Erect shrubs, with simple leaves; stipules obsolete; pods mostly* 5, *several-seeded.*

1 **S. betulæfòlia,** Pall., var. **corymbòsa,** Watson. Nearly smooth (1 – 2° high); leaves oval or ovate, cut-toothed toward the apex; *corymbs large, flat,* several times compound; *flowers white.* (S. corymbosa, *Raf.*) — Mountains of Penn. and N. J. to Ga., west to Ky. and Mo.

2. **S. salicifòlia,** L. (COMMON MEADOW-SWEET.) *Nearly smooth* (2 – 3° high); leaves wedge-lanceolate, simply or doubly serrate; *flowers in a crowded panicle,* white or flesh-color; pods smooth. — Wet or low grounds, Newf. to the mountains of Ga., west to Minn. and Mo.; also to the far northwest. (Eu.)

3. **S. tomentòsa,** L. (HARDHACK. STEEPLE-BUSH.) *Stems and lower surface of the* ovate or oblong serrate *leaves very woolly;* flowers in short racemes crowded in a dense panicle, rose-color, rarely white; pods woolly. — Low grounds, N. Scotia to the mountains of Ga., west to Minn. and Kan.

§ 2. ULMÀRIA. *Perennial herbs, with pinnate leaves and panicled cymose flowers; stipules kidney-form; pods* 5 – 8, 1 – 2-*seeded.*

4. **S. lobàta,** Jacq. (QUEEN OF THE PRAIRIE.) Glabrous (2 – 8° high); leaves interruptedly pinnate; the terminal leaflet very large, 7 – 9-parted, the lobes incised and toothed; panicle compound-clustered, on a long naked peduncle; flowers deep peach-blossom color, handsome, the petals and sepals often in fours. — Meadows and prairies, Penn. to Ga., west to Mich., Ky., and Iowa.

§ 3. ARÚNCUS. *Perennial herbs, with diœcious whitish flowers in many slender spikes, disposed in a long compound panicle; leaves thrice pinnate; stipules obsolete; pods* 3 – 5, *several-seeded; pedicels reflexed in fruit.*

5. **S. Arúncus,** L. (GOAT'S-BEARD.) Smooth, tall; leaflets thin, lanceolate-oblong, or the terminal ones ovate-lanceolate, taper-pointed, sharply cut and serrate. — Rich woods, N. Y. and Penn. to Ga. in the mountains, west to Iowa and Mo.

## 3. PHYSOCÁRPUS, Maxim. NINE-BARK.

Carpels 1 – 5, inflated, 2-valved; ovules 2 – 4. Seeds roundish, with a smooth and shining crustaceous testa and copious albumen. Stamens 30 – 40. Otherwise as Spiræa. — Shrubs, with simple palmately-lobed leaves and umbel-like corymbs of white flowers. (Name from φῦσα, *a bladder,* and καρπός, *fruit.*)

1. **P. opulifòlius,** Maxim. Shrub 4 – 10° high, with long recurved branches, the old bark loose and separating in numerous thin layers; leaves roundish, somewhat 3-lobed and heart-shaped; the purplish membranaceous pods very conspicuous. (Spiræa opulifolia, *L.* Neillia opulifolia, *Benth. &*

*Hook.*) — Rocky banks of streams, N. Eng. to Fla., west to Mo., and the Pacific northward. Often cultivated.

### 4. GILLÈNIA, Moench. INDIAN PHYSIC.

Calyx narrow, somewhat constricted at the throat, 5-toothed; teeth erect. Petals 5, rather unequal, linear-lanceolate, inserted in the throat of the calyx, convolute in the bud. Stamens 10 – 20, included. Pods 5, included, at first lightly cohering with each other, 2 – 4-seeded. Seeds ascending, with a close coriaceous coat, and some albumen. — Perennial herbs, with almost sessile 3-foliolate leaves; the thin leaflets doubly serrate and incised. Flowers loosely paniculate-corymbed, pale rose-color or white. (Dedicated to an obscure German botanist or physician, *A. Gille*, or *Gillenius*.)

1. **G. trifoliàta,** Moench. (BOWMAN'S ROOT.) Leaflets ovate-oblong, pointed, cut-serrate; stipules small, awl-shaped, entire. — Rich woods, N. Y. to N. J. and Ga., west to Mich., Ind., and Mo.

2. **G. stipulàcea,** Nutt. (AMERICAN IPECAC.) Leaflets lanceolate, deeply incised; stipules large and leaf-like, doubly incised. — Western N. Y. and Penn. to S. Ind. and Kan., south to Ala. and La.

### 5. RÙBUS, Tourn. BRAMBLE.

Calyx 5-parted, without bractlets. Petals 5, deciduous. Stamens numerous. Achenes usually many, collected on a spongy or succulent receptacle, becoming small drupes; styles nearly terminal. — Perennial herbs, or somewhat shrubby plants, with white (rarely reddish) flowers, and edible fruit. (The Roman name, kindred with *ruber*, red.)

§ 1. *Fruit, or collective mass of drupes, falling off whole from the dry receptacle when ripe, or of few grains which fall separately.* — RASPBERRY.

* *Leaves simple; flowers large; prickles none; fruit and receptacle flat and broad.*

1. **R. odoràtus,** L. (PURPLE FLOWERING-RASPBERRY.) *Stem shrubby* (3 – 5° high); *branches, stalks, and calyx bristly with glandular clammy hairs;* leaves 3 – 5-lobed, the lobes pointed and minutely toothed, the middle one prolonged; peduncles many-flowered; flowers showy (2′ broad); calyx-lobes tipped with a long narrow appendage; *petals rounded, purple rose-color;* fruit reddish. — N. Scotia to N. J. and Ga., west to Mich.

2. **R. Nutkànus,** Moçino. (SALMON-BERRY.) *Glandular,* scarcely bristly; leaves almost equally 5-lobed, ccarsely toothed; peduncles few-flowered; *petals oval, white.* — Upper Mich., Minn., and westward.

3. **R. Chamæmòrus,** L. (CLOUD-BERRY. BAKED-APPLE BERRY.) *Herbaceous, low, diœcious; stem simple,* 2 – 3-*leaved,* 1-*flowered;* leaves roundish-kidney-form, somewhat 5-lobed, serrate, wrinkled; calyx-lobes pointless; *petals obovate, white;* fruit of few grains, amber-color. — In sphagnous swamps, highest peaks of White Mts., coast of E. Maine, and north and west to the Arctic regions. (Eu.)

* * *Leaflets* (*pinnately or pedately*) 3 – 5; *petals small, erect, white.*

+ *Stems annual, herbaceous, not prickly; fruit of few separate grains.*

4. **R. triflòrus,** Richardson. (DWARF RASPBERRY.) Stems ascending (6 – 12′ high) or trailing; leaflets 3 (or pedately 5), rhombic-ovate or ovate-

lanceolate, acute at both ends, coarsely doubly serrate, thin, smooth; peduncle 1–3-flowered. — Wooded hillsides, Lab. to N. J., west to Minn. and Iowa. Sepals and petals often 6 or 7. This appears to be more properly a blackberry.

+– +– *Stems biennial and woody, prickly; receptacle oblong; fruit hemispherical.*

5. **R. strigòsus,** Michx. (WILD RED RASPBERRY.) *Stems upright,* and with the stalks, etc., *beset with stiff straight bristles* (or a few becoming weak hooked prickles), glandular when young, somewhat glaucous; leaflets 3–5, oblong-ovate, pointed, cut-serrate, whitish-downy underneath, the lateral ones sessile; petals as long as the sepals; *fruit light red.* — Thickets and hills, Lab. to N. J., and south in the mountains to N. C., west to Minn. and Mo.

6. **R. occidentàlis,** L. (BLACK RASPBERRY. THIMBLEBERRY.) *Glaucous all over; stems recurved, armed* like the stalks, etc., *with hooked prickles, not bristly;* leaflets 3 (rarely 5), ovate, pointed, coarsely doubly serrate, whitened-downy underneath, the lateral ones somewhat stalked; petals shorter than the sepals; *fruit purple-black* (rarely a whitish variety), ripe early in July. — Common, especially northward. — An apparent hybrid (R. neglectus, *Peck*) between this and the last species occurs, with characters intermediate between the two, and growing with them.

§ 2. *Fruit, or collective drupes, not separating from the juicy prolonged receptacle, mostly ovate or oblong, blackish; stems prickly and flowers white.* — BLACKBERRY.

7. **R. villòsus,** Ait. (COMMON OR HIGH BLACKBERRY.) Shrubby (1–6° high), furrowed, *upright or reclining, armed with stout curved prickles;* branchlets, stalks, and lower surface of the leaves *hairy and glandular;* leaflets 3 (or pedately 5), ovate, pointed, unequally serrate, the terminal ones somewhat heart-shaped, conspicuously stalked; *flowers racemed, numerous;* bracts short; sepals linear-pointed, much shorter than the obovate-oblong spreading petals. — Borders of thickets, etc., common, and very variable in size, aspect, and shape of fruit. — Var. FRONDÒSUS, Torr., is smoother and much less glandular, with flowers more corymbose, leafy bracts and roundish petals. With the type, more common at the north. — Var. HUMIFÙSUS, Torr. & Gray, is smaller and trailing, with peduncles few-flowered. More common southward, and connecting with the next species.

8. **R. Canadénsis,** L. (LOW BLACKBERRY. DEWBERRY.) *Shrubby, extensively trailing, slightly prickly;* leaflets 3 (or pedately 5–7), oval or ovate-lanceolate, mostly pointed, thin, *nearly smooth,* sharply cut-serrate; flowers racemed, with leaf-like bracts. — Dry fields, common; Newf. to Va., west to central Minn. and E. Kan.

9. **R. híspidus,** L. (RUNNING SWAMP-BLACKBERRY.) *Stems slender, scarcely woody, extensively procumbent, beset with small reflexed prickles;* leaflets 3 (or rarely pedately 5), *smooth, thickish, mostly persistent,* obovate, obtuse, coarsely serrate, entire toward the base; *peduncles leafless, several-flowered, often bristly; flowers small;* fruit of few grains, black. — In low woods or swampy grassy ground, N. Scotia to Ga., west to Minn. and E. Kan.

10. **R. cuneifòlius,** Pursh. (SAND BLACKBERRY.) *Shrubby* (1–3° high), *upright, armed with stout recurved prickles, branchlets and lower side of the leaves whitish-woolly;* leaflets 3–5, wedge-obovate, thickish, serrate above;

peduncles 2-4-flowered; *petals large.* — Sandy woods, southern N. Y. and Penn. to Fla., west to Mo. and La.

11. **R. triviàlis,** Michx. (Low Bush-Blackberry.) *Shrubby, procumbent,* bristly and prickly; *leaves evergreen, coriaceous, nearly glabrous;* leaflets 3 (or pedately 5), ovate-oblong or lanceolate, sharply serrate; peduncles 1-3-flowered; petals large. — Sandy soil, Va. to Fla., west to Mo. and Tex.

## 6. DALIBÁRDA, L.

Calyx deeply 5-6-parted, 3 of the divisions larger and toothed. Petals 5, sessile, deciduous. Stamens many. Ovaries 5-10, becoming nearly dry seed-like drupes; styles terminal, deciduous. — Low perennials, with creeping and densely tufted stems or rootstocks, and roundish-heart-shaped crenate leaves on slender petioles. Flowers 1 or 2, white, on scape-like peduncles. (Named in honor of *Thomas Dalibard,* a French botanist of the time of Linnæus.)

1. **D. rèpens,** L. Downy; sepals spreading in the flower, converging and enclosing the fruit. — Wooded banks; common northward. June-Aug. — In aspect and foliage resembling a stemless Violet.

## 7. GÈUM, L. Avens.

Calyx bell-shaped or flattish, deeply 5-cleft, usually with 5 small bractlets at the sinuses. Petals 5. Stamens many. Achenes numerous, heaped on a conical or cylindrical dry receptacle, the long persistent styles forming hairy or naked and straight or jointed tails. Seed erect; radicle inferior. — Perennial herbs, with pinnate or lyrate leaves. (A name used by Pliny, of unknown meaning.)

§ 1. GEUM proper. *Styles jointed and bent near the middle, the upper part deciduous and mostly hairy, the lower naked and hooked, becoming elongated; head of fruit sessile in the calyx; calyx-lobes reflexed.*

* *Petals white or pale greenish-yellow, small, spatulate or oblong; stipules small.*

1. **G. álbum,** Gmelin. *Smoothish or softly pubescent; stem slender* (2° high); root-leaves of 3-5 leaflets, or simple and rounded, with a few minute leaflets on the petiole below; those of the stem 3-divided or lobed, or only toothed; hairs upon the long slender peduncles ascending or spreading; *receptacle of the fruit densely bristly-hirsute.* — Borders of woods, etc.; common. May-Aug.

2. **G. Virginiànum,** L. *Bristly-hairy, especially the stout stem;* lower and root-leaves pinnate, very various, the upper mostly 3-parted or divided, incised; petals inconspicuous, shorter than the calyx; heads of fruit larger, on short stout peduncles hirsute with reflexed hairs; *receptacle glabrous* or nearly so. — Borders of woods and low grounds; common. June-Aug.

* * *Petals golden-yellow, conspicuous, broadly-obovate, exceeding the calyx; stipules larger and all deeply cut.*

3. **G. macrophýllum,** Willd. Bristly-hairy, stout (1-3° high); root-leaves lyrately and interruptedly pinnate, with the *terminal leaflet very large and round-heart-shaped;* lateral leaflets of the stem-leaves 2-4, minute, the terminal roundish, 3-cleft, the *lobes wedge-form and rounded; receptacle nearly naked.* — N. Scotia and N. Eng. to Minn., Mo., and westward. June. (Eu.)

4. **G. stríctum,** Ait. Somewhat hairy (3 – 5° high); root-leaves interruptedly pinnate, the leaflets wedge-obovate; *leaflets of the stem-leaves* 3 – 5, *rhombic-ovate or oblong, acute: receptacle downy.* — Moist meadows, Newf. to N. J., west to Minn., Kan., and westward. July, Aug. (Eu.)

§ 2. STÝLIPUS. *Styles smooth; head of fruit conspicuously stalked in the calyx; bractlets of the calyx none; otherwise nearly as* § 1.

5. **G. vérnum,** Torr. & Gray. Somewhat pubescent; stems ascending, few-leaved, slender; root-leaves roundish-heart-shaped, 3 – 5-lobed, or some of them pinnate, with the lobes cut; petals yellow, about the length of the calyx; receptacle smooth. — Thickets, Penn. to Ill., south to Ky. and Tex. April – June.

§ 3. CARYOPHYLLÀTA. *Style jointed and bent in the middle, the upper joint plumose; flowers large; calyx erect or spreading; petals erect.*

6. **G. rivàle,** L. (Water, or Purple Avens.) — Stems nearly simple, several-flowered (2° high); root-leaves lyrate and interruptedly pinnate, those of the stem few, 3-foliolate or 3-lobed; petals dilated-obovate, retuse, contracted into a claw, purplish-orange; head of fruit stalked in the brown-purple calyx. — Bogs and wet meadows, Newf. to N. J., west to Minn. and Mo. — Flowers nodding; pedicels erect in fruit. (Eu.)

§ 4. SIEVÉRSIA. *Style not jointed, wholly persistent and straight; head of fruit sessile; flowers large; calyx erect or spreading.* (*Flowering stems simple, and bearing only bracts or small leaves.*)

7. **G. triflòrum,** Pursh. Low, softly-hairy; root-leaves interruptedly pinnate; leaflets very numerous and crowded, oblong-wedge-form, deeply cut-toothed; flowers 3 or more on long peduncles; *bractlets linear, longer than the purple calyx, as long as the oblong purplish erect petals; styles very long* (2′), *strongly plumose in fruit.* — Rocks, Lab. and northern N. Eng., to Minn. and Mo.; rare. April – June.

8. **G. radiàtum,** Michx. Hirsutely hairy or smoothish; *root-leaves rounded-kidney-shaped,* radiate-veined (2 – 5′ broad), doubly or irregularly cut-toothed and obscurely 5 – 7-lobed, also a set of minute leaflets down the long petiole; stems (8 – 18′ high) 1 – 5-flowered; *bractlets minute; petals yellow, round-obovate* and more or less obcordate, exceeding the calyx (½′ long), *spreading; styles naked* except the base. (High mountains of N. C.)

Var. **Péckii,** Gray. Nearly glabrous, or the stalks and veins of the leaves sparsely hirsute. — Alpine tops of the White Mts.

Dryas octopetala, L., a dwarf matted slightly shrubby plant, with simple toothed leaves and large white solitary flowers, has the characters of this section excepting its 8 – 9-parted calyx and 8 or 9 petals. It was said by Pursh to have been found on the White Mountains, N. H., ninety years ago, but it is not known to have been seen there since.

## 8. WALDSTEÌNIA, Willd.

Calyx-tube inversely conical; the limb 5-cleft, with 5 often minute and deciduous bractlets. Petals 5. Stamens many, inserted into the throat of the calyx. Achenes 2 – 6, minutely hairy; the terminal slender styles deciduous from the base by a joint. Seed erect; radicle inferior. — Low perennial herbs, with chiefly radical 3 – 5-lobed or divided leaves, and small yellow flowers on bracted scapes. (Named in honor of *Francis von Waldstein*, a German botanist.)

1. **W. fragarioìdes,** Tratt. (BARREN STRAWBERRY.) Low; leaflets 3, broadly wedge-form, cut-toothed; scapes several-flowered; petals longer than the calyx. — Wooded hillsides, N. Eng. to Ga., west to Ind., Mich., and Minn.

## 9. FRAGÀRIA, Tourn. STRAWBERRY.

Flowers nearly as in Potentilla. Styles deeply lateral. Receptacle in fruit much enlarged and conical, becoming pulpy and scarlet, bearing the minute dry achenes scattered over its surface. — Stemless perennials, with runners, and with white cymose flowers on scapes. Leaves radical; leaflets 3, obovate-wedge-form, coarsely serrate; stipules cohering with the base of the petioles, which with the scapes are usually hairy. (Name from the fragrance of the fruit.) — Flowering in spring. (The species are indiscriminately called WILD STRAWBERRY.)

1. **F. Virginiàna,** Mill. *Achenes imbedded in the deeply pitted fruiting receptacle,* which usually has a narrow neck; calyx becoming erect after flowering and connivent over the hairy receptacle when sterile or unfructified; *leaflets of a firm or coriaceous texture; the hairs of the scapes,* and especially of the *pedicels, silky and appressed.* — Moist or rich woodlands, fields, etc.; common.

Var. **Illinoénsis,** Gray, is a coarser or larger plant, with flowers more inclined to be polygamo-diœcious, and the *villous hairs of the scape and pedicels widely spreading.* — Rich soil, western N. Y. to Minn., and westward.

2. **F. vésca,** L. *Achenes superficial on the glabrous conical or hemispherical fruiting receptacle* (not sunk in pits); calyx remaining spreading or reflexed; hairs on the scape mostly widely spreading, on the pedicels appressed; *leaflets thin,* even the upper face strongly marked by the veins. — Fields and rocky places; less common. (Eu.)

**F.** ÍNDICA, L., differing from the true strawberries in having leafy runners, a calyx with incised leafy bractlets larger than the sepals, *yellow petals,* and *insipid fruit,* has become somewhat established near Philadelphia and in the S. States; an escape from cultivation. Flowers and fruit produced through the summer and autumn. (Adv. from India.)

## 10. POTENTÍLLA, L. CINQUE-FOIL. FIVE-FINGER.

Calyx flat, deeply 5-cleft, with as many bractlets at the sinuses, thus appearing 10-cleft. Petals 5, usually roundish. Stamens many. Achenes many, collected in a head on the dry mostly pubescent or hairy receptacle; styles lateral or terminal, deciduous. Radicle superior. — Herbs, or rarely shrubs, with compound leaves, and solitary or cymose flowers; their parts rarely in fours. (Name a diminutive from *potens,* powerful, originally applied to P. Anserina, from its once reputed medicinal powers.)

§ 1. *Styles thickened and glandular toward the base; achenes glabrous, numerous: inflorescence cymose.*

* *Style nearly basal; stamens* 25 – 30: *perennial glandular-villous herbs, with pinnate leaves, and rather large white or yellow flowers.*

1. **P. argùta,** Pursh. Stems erect, usually stout (1 – 4° high), brownish-hairy, clammy above; leaflets 7 – 11, oval or ovate, cut-serrate, downy beneath;

cyme strict and rather close; stamens mostly 30, on a thick glandular disk. — Rocky hills, N. Brunswick to N. J., Minn., Kan., and westward.

* * *Style terminal; flowers small, yellow; leaves pinnate or ternate.*

+ *Annual or biennial; leaflets incisely serrate, not white-tomentose; stamens* 5 – 20.

2. **P. Norvégica,** L. *Stout, erect, hirsute* (½ – 2° high); *leaves ternate;* leaflets obovate or oblong-lanceolate; *cyme rather close,* leafy; *calyx large;* stamens 15 (rarely 20). — Lab. to N. J., west to Minn. and Kan. (Eu.)

3. **P. rivàlis,** Nutt. *More slender and branched, softly villous; leaves pinnate, with two pairs of closely approximate leaflets, or a single pair and the terminal leaflet 3-parted;* leaflets cuneate-obovate or -oblong; *cyme loose, often diffuse,* less leafy; *calyx small;* petals minute; stamens 10 – 20 (rarely 5). — Neb. to Mo. and N. Mex., and westward.

Var. **millegràna,** Watson. Leaves all ternate; stems erect, or weak and ascending; achenes often small and light-colored. — Minn. to Mo., N. Mex., and westward.

Var. **pentándra,** Watson. Leaves ternate, the lateral leaflets of the lower leaves parted nearly to the base; stamens 5, opposite to the sepals. — Iowa, Mo., and Ark.

4. **P. supìna,** L. *Stems decumbent at base* or erect, often stout, leafy, *subvillous; leaflets pinnately* 5 – 11, obovate or oblong; *cyme loose, leafy;* stamens 20; *achenes strongly gibbous on the ventral side.* (P. paradoxa, *Nutt.*) — Minn. to Mo., and westward; also eastward along the Great Lakes. — Var. NICOLLÉTII, Watson. Slender; leaflets mostly but 3; inflorescence much elongated, leafy, and falsely racemose. — Devil's Lake, Minn.

+ + *Herbaceous perennials, more or less white-tomentose; leaflets incisely pinnatifid; bractlets and sepals nearly equal; stamens* 20 - 25.

5. **P. Pennsylvánica,** L. Stems erect or decumbent at base (½ – 2° high); leaflets 5 – 9, white-tomentose beneath, short-pubescent and greener above, oblong, obtuse, the linear segments slightly or not at all revolute; cyme fastigiate but rather open. — Coast of Maine, N. H., and the lower St. Lawrence, L. Superior, and westward. July, Aug. — Var. STRIGÒSA, Lehm. Stems 6 – 12′ high; silky-tomentose throughout; leaflets deeply pinnatifid, the margins of the narrow lobes revolute; cyme short and close. — Minn. and westward.

§ 2. *Styles filiform, not glandular at base; inflorescence cymose.*

* *Style terminal; achenes glabrous; stamens* 20; *herbaceous perennials, with rather large yellow flowers.*

+ *Leaves pinnate.*

6. **P. Hippiàna,** Lehm. Densely white-tomentose and silky throughout, the upper surface of the leaves a little darker; stems ascending (1 – 1½° high), slender, branching above into a diffuse cyme; leaflets 5 – 11, cuneate-oblong, *incisely toothed at least toward the apex, diminishing uniformly down the petiole;* carpels 10 – 30. — N. W. Minn., and westward.

7. **P. effùsa,** Dougl. Tomentose throughout, with scattered villous hairs; stems ascending (4 – 12′ high), diffusely branched above; leaflets 5 – 11, *interruptedly pinnate, the alternate ones smaller,* cuneate-oblong, *coarsely-incised-serrate or dentate;* carpels 10. — W. Minn. to Mont. and Col.

+– +– *Leaves palmate, of 3 or 5 leaflets; tomentose or villous.*

8. **P. argéntea,** L. (SILVERY CINQUE-FOIL.) Stems ascending, paniculately branched at the summit, many-flowered, white-woolly; leaflets 5, wedge-oblong, almost pinnatifid, entire toward the base, with revolute margins, green above, white with silvery wool beneath. — Dry barren fields, etc., N. Scotia to N. J., west to Dak. and E. Kan. June – Sept. (Eu.)

9. **P. frígida,** Vill. Dwarf (1 – 3′ high), tufted, villous when young; leaflets 3, broadly cuneate-obovate, deeply 3 – 5-toothed at summit, nearly glabrous above; flowers mostly solitary, small, on very slender stems; bractlets and sepals equal. — Alpine summits of the White Mts. (Eu.)

* * *Style lateral; purple petals (shorter than the broad calyx) somewhat persistent; disk thick and hairy; achenes glabrous; hairy receptacle becoming large and spongy.*

10. **P. palústris,** Scop. (MARSH FIVE-FINGER.) Stems stout, ascending from a decumbent rooting perennial base ($\frac{1}{2}$ – 2° long), glabrous below; leaves pinnate; leaflets 5 – 7, oblong, serrate, lighter colored and more or less pubescent beneath; flowers few in an open cyme; calyx (1′ broad) dark purple inside. — Cool bogs, N. J. to N. Ind., Ill., Minn., and northward. (Eu.)

* * * *Style attached below the middle; achenes and receptacle densely villous; woody perennials.*

11. **P. fruticòsa,** L. (SHRUBBY CINQUE-FOIL.) *Stem erect, shrubby* (1 – 4° high), much branched; *leaves pinnate; leaflets* 5 – 7, crowded, oblong-lanceolate, *entire,* silky, usually whiter beneath and the margins revolute; *petals yellow, orbicular.* — Wet grounds, Lab. to N. J., west to Minn., northern Iowa, and north and westward. June – Sept. (Eu.)

12. **P. tridentàta,** Ait. (THREE-TOOTHED C.) Stems low (1 – 10′ high), rather woody at base, tufted, ascending, cymosely several-flowered; *leaves palmate; leaflets* 3, wedge-oblong, nearly smooth, thick, *coarsely 3-toothed at the apex; petals white;* achenes and receptacle very hairy. — Coast of N. Eng. from Cape Cod northward, Norfolk, Ct. (*Barbour*), and mountain-tops of the Alleghanies; also shores of the upper Great Lakes, and N. Iowa, Wisc., and Minn.

§ 3. *Styles filiform, lateral; peduncles axillary, solitary, 1-flowered; achenes glabrous; receptacle very villous; herbaceous perennials, with yellow flowers.*

13. **P. Anserìna,** L. (SILVER-WEED.) *Spreading by slender many-jointed runners, white-tomentose and silky-villous; leaves all radical, pinnate;* leaflets 7 – 21, with smaller ones interposed, *oblong,* sharply serrate, silky-tomentose at least beneath; bractlets and stipules often incisely cleft; peduncles elongated. — Brackish marshes, river-banks, etc., New Eng. to N. J., N. Ind., Minn., and northward. (Eu.)

14. **P. Canadénsis,** L. (COMMON CINQUE-FOIL OR FIVE-FINGER.) *Stems slender and decumbent or prostrate,* or sometimes erect; *pubescence villous, often scanty; leaves ternate, but apparently quinate* by the parting of the lateral leaflets; *leaflets cuneate-oblong or -obovate,* incisely serrate, nearly glabrous above; bractlets entire. — Dry soil; common and variable. Apr. – July. — Often producing summer runners.

## 11. SIBBÁLDIA, L.

Calyx flattish, 5-cleft, with 5 bractlets. Petals 5, linear-oblong, minute. Stamens 5, inserted alternate with the petals into the margin of the woolly disk which lines the base of the calyx. Achenes 5–10; styles lateral. — Low and depressed mountain perennials; included by some in Potentilla. (Dedicated to *Dr. Robert Sibbald*, professor at Edinburgh at the close of the 17th century.)

1. **S. procùmbens,** L. Leaflets 3, wedge-shaped, 3-toothed at the apex; petals yellow. — Alpine summits of the White Mts., and northward. (Eu.)

## 12. ALCHEMÍLLA, Tourn. LADY'S MANTLE.

Calyx-tube inversely conical, contracted at the throat; limb 4-parted with as many alternate accessory lobes. Petals none. Stamens 1–4. Pistils 1–4, the slender style arising from near the base; achenes included in the tube of the persistent calyx. — Low herbs, with palmately lobed or compound leaves, and small corymbed greenish flowers. (From *Alkemelyeh*, the Arabic name, having reference to the silky pubescence of some species.)

**A.** ARVÉNSIS, Scop. (PARSLEY PIERT.) Small annual (3–8′ high), leafy; leaves 3-parted, with the wedge-shaped lobes 2–3-cleft, pubescent; flowers fascicled opposite the axils. — Va. and N. C. (Adv. from Eu.)

## 13. AGRIMÒNIA, Tourn. AGRIMONY.

Calyx-tube top-shaped, contracted at the throat, beset with hooked bristles above, indurated in fruit and enclosing the 2 achenes; the limb 5-cleft, closed after flowering. Petals 5. Stamens 5–15. Styles terminal. Seed suspended — Perennial herbs, with interruptedly pinnate leaves, and yellow flowers in slender spiked racemes; bracts 3-cleft. (Name a corruption of *Argemonia*, of the same derivation as Argemone, p. 59.)

1. **A. Eupatòria,** L. (COMMON AGRIMONY.) *Leaflets* 5–7 *with minute ones intermixed, oblong-obovate*, coarsely toothed; petals twice the length of the calyx. — Borders of woods, common. July–Sept. (Eu.)

2. **A. parviflòra,** Ait. (SMALL-FLOWERED A.) *Leaflets crowded*, 11–19, *with smaller ones intermixed, lanceolate*, acute, deeply and regularly cut-serrate, as well as the stipules; petals small. — Woods and glades, N. Y. and N. J. to Ga., west to Mich., Kan., and La.

## 14. POTÈRIUM, L. BURNET.

Calyx with a top-shaped tube, constricted at the throat, persistent; the 4 broad petal-like spreading lobes imbricated in the bud, deciduous. Petals none. Stamens 4–12 or more, with flaccid filaments and short anthers. Pistils 1–3; the slender terminal style tipped with a tufted or brush-like stigma. Achene (commonly solitary) enclosed in the 4-angled dry and thickish closed calyx-tube. Seed suspended. — Chiefly perennial herbs, with unequally pinnate leaves, stipules coherent with the petiole, and small, often polygamous or diœcious flowers crowded in a dense head or spike at the summit of a long and naked peduncle, each bracteate and 2-bracteolate. (Name ποτήριον, *a drinking-cup*, the foliage of Burnet having been used in the preparation of some medicinal drink.)

1. **P. Canadénse,** Benth. & Hook. (CANADIAN BURNET.) Stamens 4, long-exserted, club-shaped, white, as is the whole of the elongated and cylindrical spike; stem 3 – 6° high; leaflets numerous, ovate or oblong-lanceolate, coarsely serrate, obtuse, heart-shaped at base, as if stipellate; stipules serrate. — Bogs and wet meadows, Newf. to mountains of Ga., west to Mich.

**P.** SANGUISÓRBA, L. (GARDEN BURNET.) Stamens 12 or more in the lower flowers of the globular greenish head, with drooping capillary filaments, the upper flowers pistillate only; stems about 1° high; leaflets numerous, small, ovate, deeply cut. — Fields and rocks, N. Y. to Md. (Adv. from Eu.)

## 15. RÒSA, Tourn. Rose.

Calyx-tube urn-shaped, contracted at the mouth, becoming fleshy in fruit. Petals 5, obovate or obcordate, inserted with the many stamens into the edge of the hollow thin disk that lines the calyx-tube and within bears the numerous pistils below. Ovaries hairy, becoming bony achenes in fruit. — Shrubby and usually spiny or prickly, with odd-pinnate leaves, and stipules cohering with the petiole; stalks, foliage, etc., often bearing aromatic glands. Many of the species are very variable in their characters, and are often indeterminable upon imperfect specimens. (The ancient Latin name.)

* *Styles cohering in a protruding column, as long as the stamens.*

1. **R. setígera,** Michx. (CLIMBING OR PRAIRIE ROSE.) Stems climbing, armed with stout nearly straight scattered prickles, not bristly; leaflets 3 – 5, ovate, acute, sharply serrate, smooth or downy beneath; stalks and calyx glandular; flowers corymbed; sepals pointed; petals deep rose-color changing to white; fruit (hip) globular. — Borders of prairies and thickets, Ont. to Ohio, S. C., and Fla., west to Wisc., Neb., and Tex.; also cultivated. July. — The only American climbing rose, or with united protruding styles; strong shoots growing 10 – 20° in a season.

* * *Styles distinct; sepals connivent after flowering and persistent; pedicels and receptacles naked.*

+- *Fruit oblong-obovate to oblong; infrastipular spines usually none.*

2. **R. Engelmánni,** Watson. Stems usually 3 – 4° high or less; infrastipular spines, when present, straight and slender; prickles often abundant; leaflets 5 – 7, often somewhat resinous-puberulent beneath and the teeth serrulate; flowers solitary; sepals entire, naked or hispid; fruit 6 – 12″ long. — Whisky Island, L. Huron, shores of L. Superior, and west to the Red River valley, and in the mountains from N. Mont. and N. Idaho to Col.

+- +- *Fruit globose; infrastipular spines none; acicular prickles often present.*

3. **R. blánda,** Ait. Stems 1 – 3° high, *wholly unarmed* (occasionally with a few or very rarely numerous prickles); *stipules dilated,* naked and entire, or slightly glandular-toothed; *leaflets* 5 – 7, usually oblong-lanceolate, *cuneate at base and petiolulate, simply serrate, not resinous;* flowers usually large, corymbose or solitary; *sepals hispid, entire.* — On rocks and rocky shores, Newf. to N. Eng., central N. Y., Ill. (La Salle Co.), and the region of the Great Lakes.

4. **R. Sàyi,** Schwein. Stems usually low (1 – 2° high), *very prickly; stipules usually dilated,* glandular-ciliate and resinous; *leaflets* 3 – 7, broadly elliptical to oblong-lanceolate, *sessile and obtuse or subcordate at base, resinous-*

*puberulent and teeth serrulate;* flowers large, solitary (very rarely 2 or 3); outer sepals usually with 1 or 2 narrow lateral lobes, not hispid. — N. Mich. and Wisc. to Minn. and Col.

5. **R. Arkansàna,** Porter. Stems low, *very prickly; stipules narrow,* more or less glandular-toothed above (or even glandular-ciliate); *leaflets* 7 – 11, broadly elliptical to oblong-oblanceolate, *subcuneate at base,* sessile or petiolulate, *simply toothed, not resinous;* flowers corymbose; *sepals rarely hispid, the outer lobed.* — Minn. to Mo. and W. Tex., west to Col.

+ + + *Fruit globose; infrastipular spines present.*

6. **R. Woòdsii,** Lindl. Stems usually low (¼ – 3° high), with slender straight or recurved spines, sometimes with scattered prickles, or wholly unarmed above; leaflets 5 – 7, obovate to oblong or lanceolate, more or less toothed; flowers corymbose or solitary; sepals naked or hispid, the outer usually lobed; fruit globose with a short neck. — Minn. to Mo., west to Col.

* * * *Styles distinct; sepals spreading after flowering and deciduous; infrastipular spines usually present, often with scattered prickles; sepals, globose receptacle, and pedicel usually hispid; teeth simple; pubescence not resinous.*

+ *Leaflets mostly finely many-toothed.*

7. **R. Carolìna,** L. Stems usually tall (1 – 7° high), with stout straight or usually more or less curved spines; stipules long and very narrow; leaflets dull green, 5 – 9 (usually 7), usually narrowly oblong and acute at each end and petiolulate, but often broader, usually pubescent beneath. — Borders of swamps and streams, N. Scotia to Fla., west to Minn. and Miss.

+ + *Leaflets coursely toothed.*

8. **R. lùcida,** Ehrh. Stems often tall and stout (a few inches to 6° high), *with at length stout and usually more or less hooked spines; stipules* usually naked, *more or less dilated; leaflets* (mostly 7) dark green, rather thick, *smooth and often shining above;* flowers corymbose or solitary; outer sepals frequently with 1 or 2 small lobes. — Margins of swamps or moist places, Newf. to N. Eng., N. Y., and E. Penn.

9. **R. hùmilis,** Marsh. Stems usually low (1 – 3°) and more slender, less leafy, with *straight slender spines,* spreading or sometimes reflexed; *stipules narrow,* rarely somewhat dilated; leaflets as in the last, but usually thinner and paler; flowers very often solitary; *outer sepals always more or less lobed.* (R. lucida of most authors.) — Mostly in dry soil or on rocky slopes, Maine to Ga., west to Minn., Mo., Ind. Terr., and La.

10. **R. nítida,** Willd. Low, nearly or quite *glabrous throughout, the straight slender spines often scarcely stouter than the prickles which usually thickly cover the stem and branches; stipules mostly dilated;* leaflets bright green and shining, usually narrowly oblong and acute at each end; flowers solitary (rarely 2 or 3); *sepals entire.* — Margins of swamps, Newf. to N. Eng.

*Naturalized species.*

**R.** CANÌNA, L. (DOG ROSE.) Stems armed with stout recurved spines, without prickles, the branches sometimes unarmed; leaflets 5 – 7, elliptical or oblong-ovate, glabrous or somewhat pubescent, simply toothed, not resinous-puberulent; flowers solitary (or 2 – 4) on usually naked pedicels; sepals pinnatifid, deciduous; fruit oblong-ovate to nearly globular. — Roadsides, E. Penn., Tenn., etc. (Int. from Eu.)

**R. rubiginòsa**, L. (Sweetbrier. Eglantine.) Resembling the last, but of more compact habit, *the leaflets densely resinous beneath and aromatic, and doubly serrate:* the short pedicels and pinnatifid sepals hispid. (Incl. R. micrantha, *Smith;* less aromatic, with oblong fruit and glabrous styles.) — N. Scotia and Ont. to S. C. and Tenn. (Int. from Eu.)

## 16. PỲRUS, L. Pear. Apple.

Calyx-tube urn-shaped, the limb 5-cleft. Petals roundish or obovate. Stamens numerous. Styles 2 – 5. Pome fleshy or berry-like; the 2 – 5 carpels or cells of a papery or cartilaginous texture, 2-seeded. — Trees or shrubs, with handsome flowers in corymbed cymes. (The classical name of the Pear-tree.)

§ 1. MÀLUS (Apple). *Leaves simple; cymes simple and umbel-like; pome fleshy, globular, sunk in at the attachment of the stalk.*

1. **P. coronària**, L. (American Crab-Apple.) *Leaves ovate*, often rather heart-shaped, *cut-serrate or lobed*, soon glabrous; *styles woolly and united at base.* — Glades, Ont. and W. New York to N. C., west to Minn., Kan., and La. May. — Tree 20° high, somewhat thorny, with large rose-colored very fragrant blossoms, few in a corymb; fruit fragrant and greenish.

2. **P. angustifòlia**, Ait. Resembling the last, but with *leaves oblong or lanceolate,* often acute at base, mostly toothed, glabrous; *styles distinct.* — Glades, Penn. to Fla., west to S. Ind., Kan., and La. April.

§ 2. ADENÒRHACHIS. *Leaves simple, the midrib glandular along the upper side; cymes compound; styles united at base; fruit berry-like, small.*

3. **P. arbutifòlia**, L. f. (Choke-berry.) A shrub usually 1 - 3° high; leaves oblong or oblanceolate, mostly acute or acuminate, finely glandular-serrate, tomentose beneath; cyme tomentose; flowers white or reddish; fruit pear-shaped, or globose when ripe, small, red or purple, astringent. — Swamps and damp thickets; common, from N. Scotia to Fla., and west to Minn., Ill., Mo., and La.

Var. **melanocárpa**, Hook. Nearly smooth throughout, with larger black fruit; leaves usually less acute. — Of apparently the same range.

§ 3. SÓRBUS. *Leaves odd-pinnate, with rather numerous leaflets; cymes compound; styles separate; pome berry-like, small.*

4. **P. Americàna**, DC. (American Mountain-Ash.) Tree or tall shrub, *nearly glabrous* or soon becoming so; *leaflets* 13 – 15, *lanceolate, taper-pointed,* sharply serrate with pointed teeth, bright green; cymes large and flat; berries globose, bright red, not larger than peas; *leaf-buds pointed, glabrous* and somewhat *glutinous.* — Swamps and mountain-woods, Newf. to mountains of N. C., west to N. Mich. and Minn. Often cultivated.

5. **P. sambucifòlia**, Cham. & Schlecht. *Leaflets oblong, oval, or lance-ovate, mostly obtuse* or abruptly short-pointed, serrate (mostly doubly) with more spreading teeth, often pale beneath; cymes smaller; flowers and berries larger, the latter (4‴ broad) when young ovoid, at length globose; *leaf-buds sparingly hairy;* otherwise nearly as the preceding. — Lab. to northern N. Eng. and Lake Superior, and westward.

### 17. CRATÆGUS, L. HAWTHORN. WHITE THORN.

Calyx-tube urn-shaped, the limb 5-cleft. Petals 5, roundish. Stamens many, or only 10 – 5. Styles 1 – 5. Pome drupe-like, containing 1–5 bony 1-seeded stones. — Thorny shrubs or small trees, with simple and mostly lobed leaves, and white (rarely rose-colored) blossoms (Name from *κράτος*, *strength*, on account of the hardness of the wood.)

* *Corymbs many-flowered.*

+ *Fruit small, depressed-globose* (*not larger than peas*), *bright red ; flowers mostly small ; calyx-teeth short and broad* (*except in* n. 3) ; *styles* 5 ; *glabrous* (*except* C. Pyracantha) *and glandless.*

**C.** PYRACÁNTHA, Pers. (EVERGREEN THORN.) *Leaves evergreen*, shining (1′ long), *oblong* or spatulate-lanceolate, crenulate; the short petioles and young branchlets pubescent ; corymbs small. — Shrub, spontaneous near Washington and Philadelphia. (Adv. from Eu.)

1. **C. spathulàta,** Michx. Shrub or tree, 10 – 25° high ; *leaves thickish, shining*, deciduous, *spatulate* or oblanceolate, with a *long tapering base, crenate* above, rarely cut-lobed, *nearly sessile.* — Va. to Fla., west to Mo. and Tex.

2. **C. cordàta,** Ait. (WASHINGTON THORN.) Trunk 15 – 25° high ; *leaves broadly ovate or triangular,* mostly truncate or a little heart-shaped at the base, on a *slender petiole, variously* 3 – 5*-cleft or cut, serrate.* — Va. to Ga. in the mountains, west to Mo.

3. **C. víridis,** L. A small tree, often unarmed ; leaves ovate to ovate-oblong or lanceolate, or oblong-obovate, mostly acute at both ends, on slender petioles, acutely serrate, often somewhat lobed, and often downy in the axils ; flowers larger, numerous ; fruit bright red or rarely orange. (C. arborescens, *Ell.*)—Mississippi bottoms from St. Louis to the Gulf, and from S. Car. to Tex.

+ + *Fruit small* (¼ – ⅓′ *long*), *ovoid, deep red ; flowers rather large ; styles* 1 – 3.

**C.** OXYACÁNTHA, L. (ENGLISH HAWTHORN.) Smooth ; *leaves obovate*, cut-lobed and toothed, *wedge-form* at the base ; calyx not glandular. More or less spontaneous as well as cultivated. (Adv. from Eu.)

4. **C. apiifòlia,** Michx. Softly pubescent when young ; *leaves roundish,* with a broad truncate or slightly heart-shaped base, *pinnately* 5 – 7*-cleft,* the crowded divisions cut-lobed and sharply serrate ; petioles slender ; calyx-lobes glandular-toothed, slender. — S. Va. to Fla., west to Mo. and Tex.

+ + + *Fruit large* (½ – 1′ *long*), *red ; flowers large ; styles and stones even in the same species* 1 – 3 (*when the fruit is ovoid or pear-shaped*) *or* 4–5 (*in globular fruit*) ; *stipules, calyx-teeth, bracts, etc., often beset with glands ; shrubs or low trees.* [Species as characterized by Prof. C. S. SARGENT.]

5. **C. coccínea,** L. Branches reddish ; spines stout, chestnut-brown ; villous-pubescent on the shoots, glandular peduncles, and calyx ; leaves on slender petioles, thin, pubescent beneath or often glabrous, round-ovate, cuneate or subcordate at base, acutely glandular-toothed, sometimes cut-lobed ; flowers ½′ broad ; fruit coral-red, globose or obovate, ½′ broad.—Newf. to Minn. and southward.—Var. MACRACÁNTHA, Dudley ; spines longer ; leaves thicker, cuneate at base, on stout petioles, often deeply incised ; cymes broader ; flowers and fruit rather larger. — From the St. Lawrence and E. Mass. to Minn.

Var. **móllis,** Torr. & Gray. Shoots densely pubescent ; leaves large, slender-petioled, cuneate, truncate or cordate at base, usually with acute narrow lobes, often subscabrous above, more or less densely pubescent beneath; flowers 1′ broad, in broad cymes; fruit bright scarlet with a light bloom, 1′ broad. (C. tomentosa, var. mollis, *Gray*. C. subvillosa, *Schrad.*) — E. Mass. to Mo. and Tex. Sometimes 20 – 30° high, blooming two weeks before the type.

6. **C. tomentòsa,** L. Branches gray, rarely with stout gray spines; shoots, peduncles, and calyx villous-pubescent; glands none; leaves large, pale, prominently veined, densely pubescent beneath, ovate or ovate-oblong, sharply serrate, usually incisely lobed, contracted into a margined petiole; flowers small, ill-scented; fruit dull red, obovate, rarely globose (½′ broad), upright. — Western N. Y. to Mich., Mo., and Ga. In flower 2 – 3 weeks after n. 5.

7. **C. punctàta,** Jacq. Branches horizontal; glands none; leaves smaller, mostly wedge-obovate, attenuate and entire below, unequally toothed above, rarely lobed, villous-pubescent becoming smooth but dull, the many veins more impressed, prominent beneath; fruit globose (1′ broad), red or bright yellow. (C. tomentosa, var. punctata, *Gray*.) — Quebec to Ont. and south to Ga.

8. **C. Crus-gálli,** L. (COCKSPUR THORN.) Branches horizontal, with slender thorns often 4′ long; *glabrous; leaves thick*, dark green, *shining above, wedge-obovate and oblanceolate*, tapering into a very short petiole, serrate above the middle; fruit globular, dull red (⅓′ broad). — Thickets, common.

* * *Corymbs simple, few-* (1 – 6-) *flowered; calyx, bracts, etc., glandular.*

9. **C. flàva,** Ait. (SUMMER HAW.) Tree 15 – 20° high, somewhat pubescent or glabrous; *leaves wedge-obovate or rhombic-obovate*, narrowed into a glandular petiole, *unequally toothed and somewhat cut* above the middle, *rather thin*, the teeth *glandular;* styles 4 – 5; fruit somewhat pear-shaped, yellowish, greenish, or reddish (½′ broad) — Sandy soil, Va. to Mo., and southward.

Var. **pubéscens,** Gray. Downy or villous-pubescent when young; leaves thickish, usually obtuse or rounded at the summit; fruit larger (¾′ broad), scarlet or sometimes yellow. — Va. to Fla.

10. **C. parvifòlia,** Ait. (DWARF THORN.) Shrub 3 – 6° high, downy; *leaves thick, obovate-spatulate, crenate-toothed* (½ – 1½′ long), almost sessile, the upper surface at length shining; flowers solitary or 2 – 3 together on *very short peduncles; calyx-lobes as long as the petals;* styles 5; fruit globular or pear-shaped, yellowish. — Sandy soil, N. J. to Fla. and La.

## 18. AMELÁNCHIER, Medic. JUNE-BERRY.

Calyx 5-cleft; lobes downy within. Petals oblong, elongated. Stamens numerous, short. Styles 5, united below. Ovary 5-celled, each cell 2-ovuled, but a projection grows from the back of each and forms a false cartilaginous partition; the berry-like pome thus 10-celled, with one seed in each cell (when all ripen). — Small trees or shrubs, with simple sharply serrated leaves, and white racemose flowers. (*Amelancier* is the name of A. vulgaris in Savoy.)

1. **A. Canadénsis,** Torr. & Gray. (SHAD-BUSH. SERVICE-BERRY.) A tree 10 – 30° high, nearly or soon glabrous; leaves ovate to ovate-oblong, usually somewhat cordate at base, pointed, very sharply serrate, 1 – 3½′ long; bracts and stipules very long-silky-ciliate; flowers large, in drooping nearly glabrous racemes; petals oblong, 6 – 8″ long; fruit on elongated pedicels, globose, crimson or purplish, sweet and edible. (Var. Botryapium, *Torr. & Gray.*) — Dry open woodlands; Newf. to Fla., west to Minn., E. Kan., and La. Fruit ripen-

ing in June. — Var. ROTUNDIFÒLIA, Torr. & Gray, appears to be only a broad-leaved form.

Var. (?) **oblongifòlia,** Torr. & Gray. A smaller tree or shrub (6 – 10° high), the young leaves and racemes densely white-tomentose; leaves oblong or sometimes rather broadly elliptical, acute, mostly rounded at base, finely serrate, 1 – 2′ long; flowers in denser and shorter racemes; petals 3 – 4″ long, oblong-spatulate; fruit similar but more juicy, on shorter pedicels. — Low moist grounds or swampy woods; N. Brunswick to Va., west to Minn. and Mo. — A form of this with broader leaves (broadly elliptical or rounded), often very obtuse at the summit, and rounded, subcordate or acute at base, and usually coarsely toothed, is common from Manitoba to Minn. and Iowa, and is sometimes cultivated for its fruit.

2. **A. oligocárpa,** Roem. A low shrub 2 – 4° high, soon glabrous; leaves thin, *oblong, acute at both ends, finely serrate,* 1 – 2′ long; *flowers few* (1 – 4), rather long-pedicelled; *petals oblong-obovate; fruit broad-pyriform,* dark purple with a dense bloom. (A. Canadensis, var. oligocarpa, *Torr. & Gray.*) — Cold swamps and mountain bogs; Lab. to northern N. Eng. and N. Y., and the shores of Lake Superior.

3. **A. alnifòlia,** Nutt. A shrub 3 – 8° high, usually glabrate or nearly so; leaves *somewhat glaucous* and thickish, *broadly elliptical or roundish, very obtuse or rarely acute,* often subcordate at base, *coarsely toothed toward the summit,* ½ – 2′ long; raceme short and rather dense; petals cuneate-oblong, 3 – 8″ long; fruit globose, purple. (A. Canadensis, var. alnifolia, *Torr. & Gray*) — A western mountain species, which occurs in Minn. and N. Mich., and which the broad-leaved form of A. Canadensis sometimes closely simulates.

## ORDER 34. CALYCANTHÀCEÆ. (CALYCANTHUS FAMILY.)

*Shrubs with opposite entire leaves, no stipules, the sepals and petals similar and indefinite, the anthers adnate and extrorse, and the cotyledons convolute; the fruit like a rose-hip.* Chiefly represented by the genus

### 1. CALYCÁNTHUS, L. CAROLINA ALLSPICE. SWEET-SCENTED SHRUB.

Calyx of many sepals, united below into a fleshy inversely conical cup (with some leaf-like bractlets growing from it); the lobes lanceolate, mostly colored like the petals, which are similar, in many rows, thickish, inserted on the top of the closed calyx-tube. Stamens numerous, inserted just within the petals, short; some of the inner ones sterile (destitute of anthers). Pistils several or many, enclosed in the calyx-tube, inserted on its base and inner face, resembling those of the Rose; but the enlarged hip dry when ripe, enclosing the achenes. — The lurid purple flowers terminating the leafy branches. Bark and foliage aromatic; the crushed flowers exhaling more or less the fragrance of strawberries. (Name composed of κάλυξ, *a cup* or *calyx*, and ἄνθος, *flower*, from the closed cup which contains the pistils.)

1. **C. flóridus,** L. *Leaves oval, soft-downy underneath.* — Virginia(?) and southward, on hillsides in rich soil. Common in gardens. April – Aug.

2. **C. lævigàtus,** Willd. *Leaves oblong,* thin, either blunt or taper-pointed, *bright green and glabrous* or nearly so on both sides, or rather pale beneath; flowers smaller. — Mountains of Franklin Co., Penn. (*Prof. Porter*), and southward along the Alleghanies. May – Aug.

3. **C. glaùcus,** Willd. *Leaves* oblong-ovate or ovate-lanceolate, *conspicuously taper-pointed, glaucous-white beneath,* roughish above, glabrous, large (4 – 7′ long), probably a variety of the preceding. — Virginia (?) near the mountains and southward. May – Aug.

## ORDER 35. SAXIFRAGÀCEÆ. (SAXIFRAGE FAMILY.)

*Herbs or shrubs, of various aspect, distinguishable from* Rosaceæ *by having copious albumen in the seeds, opposite as well as alternate leaves, and usually no stipules, the stamens mostly definite, and the carpels commonly fewer than the sepals,* either separate or partly so, or all combined into one compound pistil. Calyx either free or adherent, usually persistent or withering away. Stamens and petals almost always inserted on the calyx. Ovules anatropous.

**Tribe I. SAXIFRAGEÆ.** Herbs. Leaves alternate (rarely opposite in n. 2 and 6). Fruit dry, capsular or follicular, the styles or tips of the carpels distinct.

* Ovary 2- (rarely 3-) celled with axile placentas, or of as many nearly distinct carpels.

1. **Astilbe.** Flowers polygamous, panicled. Stamens (8 or 10) twice as many as the small petals. Seeds few. Leaves decompound.
2. **Saxifraga.** Flowers perfect. Petals 5. Stamens 10. Seeds numerous, with a close coat.
3. **Boykinia.** Flowers perfect. Stamens only as many as the petals, which are convolute in the bud and deciduous. Calyx-tube adherent to the ovary. Seed-coat close.
4. **Sullivantia.** Flowers perfect. Stamens 5. Calyx nearly free. Seeds wing-margined.

* * Ovary 1-celled, with 2 parietal placentas alternate with the stigmas. Sterile stamens none.

5. **Tiarella.** Calyx nearly free from the slender ovary. Petals entire. Stamens 10. Placentas nearly basal.
6. **Mitella.** Calyx partly cohering with the depressed ovary. Petals small, pinnatifid. Stamens 10.
7. **Heuchera.** Calyx bell-shaped, coherent with the ovary below. Petals small, entire. Stamens 5.
8. **Chrysosplenium.** Calyx-tube coherent with the ovary. Petals none. Stamens 10.

* * * Ovary 1-celled, with 3 - 4 parietal placentas opposite the sessile stigmas. A cluster of united sterile filaments at the base of each petal.

9. **Parnassia.** Sepals, petals and proper stamens 5. Peduncle scape-like, 1-flowered.

**Tribe II. HYDRANGEÆ.** Shrubs. Leaves opposite, simple. Ovary 2 - 5-celled; the calyx coherent at least with its base. Fruit capsular.

* Stamens 8 or 10.

10. **Hydrangea.** Calyx-lobes minute in complete flowers. Petals valvate in the bud.

* * Stamens 20 - 40.

11. **Decumaria.** Calyx-lobes small. Petals 7 - 10, valvate in the bud. Filaments subulate. Style 1.
12. **Philadelphus.** Calyx-lobes conspicuous. Petals 4 – 5, convolute in the bud. Filaments linear. Styles 3 - 5

**Tribe III. ESCALLONIEÆ.** Shrubs. Leaves alternate and simple. Ovary 2 - 5-celled. Fruit capsular.

13. **Itea.** Calyx 5-cleft, free from the 2-celled ovary, which becomes a septicidal capsule.

**Tribe IV. RIBESIEÆ.** Shrubs. Leaves alternate and simple, with stipules adnate to the petiole or wanting. Fruit a berry.

14. **Ribes.** Calyx-tube adnate to the 1-celled ovary. Placentas 2, parietal, many-seeded.

## 1. ASTÍLBE, Don. FALSE GOATSBEARD.

Flowers diœciously polygamous. Calyx 4–5-parted, small. Petals 4–5, spatulate, small, withering-persistent. Stamens 8 or 10. Ovary 2-celled, almost free, many-ovuled; styles 2, short. Capsule 2-celled, separating into 2 follicles, each ripening few seeds. Seed-coat loose and thin, tapering at each end. — Perennial herbs, with twice or thrice ternately-compound ample leaves, cut-lobed and toothed leaflets, and small white or yellowish flowers in spikes or racemes, which are disposed in a compound panicle. (Name composed of ἀ- privative and στίλβη, *a bright surface*, because the foliage is not shining.)

1. **A. decándra,** Don. Somewhat pubescent (3–5° high); leaflets mostly heart-shaped; petals minute or wanting in the fertile flowers: stamens 10. — Rich woods; mountains of S. W. Va. to N. C. and Ga. Closely imitating Spiræa Aruncus, but coarser.

## 2. SAXÍFRAGA, L. SAXIFRAGE.

Calyx either free from or cohering with the base of the ovary, 5-cleft or parted. Petals 5, entire, imbricated in the bud, commonly deciduous. Stamens 10. Styles 2. Capsule 2-beaked, 2-celled, opening down or between the beaks, or sometimes 2 almost separate follicles. Seeds numerous, with a close coat. — Chiefly perennial herbs, with the root-leaves clustered, those of the stem mostly alternate. (Name from *saxum*, a rock, and *frango*, to break; many species rooting in the clefts of rocks.)

* *Stems prostrate, in tufts, leafy; leaves opposite; calyx free from the capsule.*

1. **S. oppositifòlia,** L. (MOUNTAIN SAXIFRAGE.) Leaves fleshy, ovate, keeled, ciliate, imbricated on the sterile branches (1–2″ long): flowers solitary, large; petals purple, obovate, much longer than the 5-cleft-calyx. — Rocks, Willoughby Mountain, Vt., and northward. (Eu.)

* * *Stems ascending; leaves alternate; calyx coherent below with the capsule.*

2. **S. rivulàris,** L. (ALPINE BROOK-S.) Small, stems weak, 3–5-flowered; lower *leaves rounded*, 3–5-*lobed*, on slender petioles, the upper lanceolate; *petals white, ovate.* — Alpine region of the White Mts., to Lab. (Eu.)

3. **S. aizoìdes,** L. (YELLOW MOUNTAIN-S.) Low (3–5′ high), in tufts, with few or several corymbose flowers; *leaves linear-lanceolate, entire, fleshy*, distantly spinulose-ciliate; *petals yellow, spotted with orange, oblong.* — N. Vt. to S. W. New York, N. Mich., and northward. June. (Eu.)

4. **S. tricuspidàta,** Retz. Stems tufted (4–8′ high), naked above; flowers corymbose, *leaves oblong or spatulate, with 3 rigid sharp teeth* at the summit, *petals obovate-oblong, yellow.* — Shore of L. Superior, and northward. (Eu.)

* * * *Leaves clustered at the root; scape many-flowered, erect, clammy-pubescent.*

+ *Petals all alike.*

5. **S. Aizòon,** Jacq. Scape 5–10′ high; *leaves persistent, thick, spatulate, with white cartilaginous toothed margins;* calyx partly adherent; petals ob-

ovate, cream-color, often spotted at the base. — Moist rocks, Lab. to N. Vt., L. Superior, and northward. (Eu.)

6 **S. Virginiénsis,** Michx. (EARLY S.) Low (4 – 9′ high); *leaves obovate or oval-spatulate,* narrowed into a broad petiole, crenate-toothed, thickish; flowers in a clustered cyme, which is at length open and loosely panicled; lobes of the nearly free *calyx erect, not half the length of the oblong obtuse* (*white*) *petals;* follicles united merely at the base, divergent, purplish. — Exposed rocks and dry hillsides; N. Brunswick to Ga., and west to Minn., Ohio, and Tenn.; common, especially northward. April – June.

7. **S. Pennsylvánica,** L. (SWAMP S.) Large (1 – 2° high); *leaves oblanceolate, obscurely toothed* (4 – 8′ long), narrowed at base into a short and broad petiole; cymes in a large oblong panicle, at first clustered; lobes of the nearly free *calyx recurved, about the length of the linear-lanceolate* (*greenish*) *small petals; filaments awl-shaped;* follicles at length divergent. — Bogs, N. Eng. to Va., west to Minn. and Iowa.

8. **S. eròsa,** Pursh. (LETTUCE S.) *Leaves oblong or oblanceolate, obtuse, sharply toothed,* tapering into a margined petiole (8 – 12′ long); scape slender (1 – 3° high); panicle elongated, loosely flowered; pedicels slender; *calyx reflexed, entirely free, nearly as long as the oval obtuse* (*white*) *petals; filaments club-shaped;* follicles nearly separate, diverging, *narrow, pointed,* 2 – 3″ long. — Cold mountain brooks, Penn. to Va. and N. C.

9. **S. Forbèsii,** Vasey. Stem stout, 2 – 4° high; *leaves denticulate, oval to elongated oblong* (4 – 8′ long); *filaments filiform; follicles short, ovate;* otherwise as in the last. — Shaded cliffs, near Makanda, S. Ill. (*Forbes*); E. Mo. (*Lettermann.*)

+ + *Petals unequal, with claws, white, all or some of them with a pair of yellow spots near the base; leaves oblong, wedge-shaped or spatulate; calyx free and reflexed.*

10. **S. leucanthemifòlia,** Michx. Leaves coarsely toothed or cut, tapering into a petiole; stems (5 – 18′ high) bearing one or more leaves or leafy bracts and a loose, spreading corymbose or paniculate cyme; *petals* lanceolate, the 3 *larger ones with a heart-shaped base* and a pair of spots, the 2 smaller with a tapering base and no spots. — Mts. of Va. to N. C. and Ga.

11. **S. stellàris,** L., var. **comòsa,** Willd. Leaves wedge-shaped, more or less toothed; scape (4 – 5′ high) bearing a small contracted panicle, many or most of the flowers changed into little tufts of green leaves; *petals all lanceolate and tapering into the claw.* — Mt. Katahdin, Maine, north to Lab. and Greenland. (Eu.)

## 3. BOYKÍNIA, Nutt.

Calyx-tube top-shaped, coherent with the 2-celled and 2-beaked capsule. Stamens 5, as many as the deciduous petals, these mostly convolute in the bud. Otherwise as in Saxifraga. — Perennial herbs, with alternate palmately 5 – 7-lobed or cut petioled leaves, and white flowers in cymes. (Dedicated to the late *Dr. Boykin* of Georgia.)

1. **B. aconitifòlia,** Nutt. Stem glandular (6 – 20′ high); leaves deeply 5 – 7-lobed. — Mountains of southwestern Va. to Ga. and Tenn. July.

### 4. SULLIVÁNTIA, Torr. & Gray.

Calyx bell-shaped, cohering below only with the base of the ovary, 5-cleft. Petals 5, oblanceolate, entire, acutish, withering-persistent. Stamens 5, shorter than the petals. Capsule 2-celled, 2-beaked, many-seeded, opening between the beaks, the seeds wing-margined, imbricated upward. — A low and reclined-spreading perennial herb, with rounded and cut-toothed or slightly lobed smooth leaves, on slender petioles, and small white flowers in a branched loosely cymose panicle, raised on a nearly leafless slender stem (6 – 12′ long). Peduncles and calyx glandular; pedicels recurved in fruit. (Dedicated to the distinguished bryologist who discovered our species.)

1 **S. Ohiònis,** Torr. & Gray. — Limestone cliffs, Ohio to Ind., Iowa, and Minn. June.

### 5. TIARÉLLA, L. FALSE MITRE-WORT.

Calyx bell-shaped, nearly free from the ovary, 5-parted. Petals 5, with claws, entire. Stamens 10, long and slender. Styles 2. Capsule membranaceous, 1-celled, 2-valved; the valves unequal. Seeds few, at the base of each parietal placenta, globular, smooth. — Perennials; flowers white. (Name a diminutive from *τιάρα*, *a tiara*, or turban, from the form of the pod, or rather pistil, which is like that of Mitella, to which the name of *Mitre-wort* properly belongs.)

1. **T. cordifòlia,** L. Leaves from the rootstock or summer runners heart-shaped, sharply lobed and toothed, sparsely hairy above, downy beneath; stem leafless or rarely with 1 or 2 leaves (5 – 12′ high); raceme simple; petals oblong, often subserrate. — Rich rocky woods, N. Eng. to Minn. and Ind., and southward in the mountains. April, May.

### 6. MITÉLLA, Tourn. MITRE-WORT. BISHOP'S-CAP.

Calyx short, coherent with the base of the ovary, 5-cleft. Petals 5, slender, pinnatifid. Stamens 5 or 10, included. Styles 2, very short. Capsule short, 2-beaked, 1-celled, with 2 parietal or rather basal several-seeded placentæ, 2-valved at the summit. Seeds smooth and shining. — Low and slender perennials, with round heart-shaped alternate leaves on the rootstock or runners, on slender petioles; those on the flowering stems opposite, if any. Flowers small, in a simple slender raceme or spike Fruit soon widely dehiscent. (Diminutive of *mitra*, a cap, alluding to the form of the young pod.)

1 **M. diphýlla,** L. *Hairy; leaves heart-shaped, acute,* somewhat 3 – 5-lobed, toothed, *those on the many-flowered stem* 2, *opposite, nearly sessile,* with interfoliar stipules; flowers white, in a raceme 6 – 8′ long; stamens 10. — Hillsides in rich woods; N. Eng. to N. C., west to Minn. and Mo. May.

2. **M. nùda,** L. Small and slender; *leaves rounded or kidney-form,* deeply and doubly crenate; *stem usually leafless, few-flowered,* very slender (4 – 6′ high); flowers greenish; stamens 10. — Deep moist woods, in moss, N. Eng. to N. Y., Mich., Minn, and northward. May – July.

### 7. HEÙCHERA, L. ALUM-ROOT.

Calyx bell-shaped, the tube cohering at the base with the ovary, 5-cleft. Petals 5, spatulate, small, entire. Stamens 5. Styles 2, slender. Capsule 1-celled, with 2 parietal many-seeded placentæ, 2-beaked, opening between the beaks. Seeds oval, with a rough and close seed-coat. — Perennials, with the round heart-shaped leaves principally from the rootstock; those on the stems, if any, alternate. Petioles with dilated margins or adherent stipules at their base. Flowers in small clusters disposed in a prolonged and narrow panicle, greenish or purplish. (Named in honor of *John Henry Heucher*, a German botanist of the beginning of the 18th century.)

* *Flowers small, loosely panicled; stamens and styles exserted; calyx regular.*

1. **H. villòsa,** Michx. Stems (1 – 3° high), petioles, and veins of the *acutely* 7 – 9-lobed leaves *villous with rusty hairs* beneath; calyx 1½″ long; *petals spatulate-linear, about as long as the stamens,* soon twisted. — Rocks, Md. to Ga., west to Ind. and Mo. Aug., Sept.

2. **H. Rugélii,** Shuttlw. Stems slender, ½ – 2° high, glandular-hirsute, as well as the petioles, etc.; *leaves round-reniform, with* 7 – 9 *short and broad rounded lobes;* flowers very small (1″ long); petals linear-spatulate, twice as long as the calyx-lobes; fruit narrow. — Shaded cliffs, S. Ill. to Tenn. and N. C.

3. **H. Americàna,** L. (COMMON ALUM-ROOT.) Stems (2 – 3° high), etc., *glandular* and more or less *hirsute with short hairs;* leaves roundish, with short rounded lobes and crenate teeth; *calyx very broad,* 2″ long, the *spatulate petals not longer than its lobes.* — Rocky woodlands, Conn. to N. C., west to Minn., Mo., and Miss.

* * *Flowers larger, in a very narrow panicle; calyx* (3 – 4″ *long*) *more or less oblique; stamens short; leaves rounded, slightly* 5 – 9*-lobed.*

4. **H. híspida,** Pursh. Stems 2 – 4° high; *hispid or hirsute* with long spreading hairs (occasionally almost glabrous), scarcely glandular; *stamens soon exserted, longer than the spatulate petals.* — Mountains of Va. and N. C., west to Minn. and E. Kan. May, June.

5. **H. pubéscens,** Pursh. Stem (1 – 3° high) and petioles *granular-pubescent or glandular above,* not hairy, below often glabrous; *stamens shorter than the lobes of the calyx* and the spatulate petals. — Rich woods, in the mountains, from Penn. to Ky., and southward. June, July.

### 8. CHRYSOSPLÈNIUM, Tourn. GOLDEN SAXIFRAGE.

Calyx-tube coherent with the ovary; the blunt lobes 4 – 5, yellow within. Petals none. Stamens 8 – 10, very short, inserted on a conspicuous disk. Styles 2. Capsule inversely heart-shaped or 2-lobed, flattened, very short, 1-celled with 2 parietal placentæ, 2-valved at the top, many-seeded. — Low and small smooth herbs, with tender succulent leaves, and small solitary or leafy-cymed flowers. (Name compounded of χρυσός, *golden,* and σπλήν, *the spleen;* probably from some reputed medicinal qualities.)

1. **C. Americànum,** Schwein. Stems slender, *decumbent* and forking; *leaves principally opposite,* roundish or somewhat heart-shaped, obscurely crenate-lobed; *flowers distant,* inconspicuous, *nearly sessile* (greenish tinged with yellow or purple). — Cold wet places, N. Scotia to N. Ga., west to Minn.

2. **C. alternifòlium,** L. *Stems erect; leaves alternate,* reniform-cordate, doubly crenate or somewhat lobed; *flowers corymbose.* — Decorah, Iowa, west to the Rocky Mts., and north through Brit. Amer. (Eu., Asia.)

### 9. PARNÁSSIA, Tourn. Grass of Parnassus.

Sepals 5, imbricated in the bud, slightly united at the base, and sometimes also with the base of the ovary, persistent. Petals 5, veiny, spreading, at length deciduous, imbricated in the bud; a cluster of somewhat united gland-tipped sterile filaments at the base of each. Proper stamens 5, alternate with the petals, persistent; anthers introrse or subextrorse. Ovary 1-celled, with 4 projecting parietal placentæ; stigmas 4, sessile, directly over the placentæ. Capsule 4-valved, the valves bearing the placentæ on their middle. Seeds very numerous, anatropous, with a thick wing-like seed-coat and little if any albumen. Embryo straight; cotyledons very short. — Perennial smooth herbs, with entire leaves, and solitary flowers on long scape-like stems, which usually bear a single sessile leaf. Petals white, with greenish or yellowish veins. (Named from Mount Parnassus; called Grass of Parnassus by Dioscorides.)

1. **P. parviflòra,** DC. *Petals sessile,* little longer than the calyx (3″ long); *sterile filaments about* 7 *in each set, slender; leaves ovate or oblong,* tapering at base. — Sandy banks, Lab. to Mich., N. Minn., and westward.

2. **P. palústris,** L. Scapes 3 – 10′ high; leaves heart-shaped; flower nearly 1′ broad; *petals sessile,* rather longer than the calyx, few-veined; *sterile filaments* 9 – 15 *in each set, slender.* — Same range as the last. (Eu.)

3. **P. Caroliniàna,** Michx. Scapes 9′ – 2° high; flower 1 – 1½′ broad; *petals sessile,* more than twice as long as the calyx, many-veined; *sterile filaments* 3 *in each set, stout, distinct almost to the base;* leaves thickish, ovate or rounded, often heart-shaped, usually but one low down on the scape and clasping. —Wet banks, N. Brunswick to Fla., west to Minn., Iowa, and La.

4. **P. asarifòlia,** Vent. *Petals abruptly contracted into a claw* at base; *sterile filaments* 3 *in each set; leaves rounded, kidney-shaped;* otherwise as in the foregoing. — High mountains of Va. and N. C.

### 10. HYDRÀNGEA, Gronov.

Calyx-tube hemispherical, 8 – 10-ribbed, coherent with the ovary; the limb 4 – 5-toothed. Petals ovate, valvate in the bud. Stamens 8 – 10, slender. Capsule 15-ribbed, crowned with 2 – 4 diverging styles, 2-celled below, many-seeded, opening by a hole between the styles. — Shrubs, with opposite petioled leaves, no stipules, and numerous flowers in compound cymes. The marginal flowers are usually sterile and radiant, consisting merely of a showy membranaceous and colored flat and dilated calyx. (Name from ὕδωρ, *water,* and ἄγγος, *a vase,* from the shape of the capsule.)

1. **H. arboréscens,** L. (Wild Hydrangea.) Glabrous or nearly so, 1 – 8° high; leaves ovate, rarely heart-shaped, pointed, serrate, *green both sides;* cymes flat; flowers often all fertile, rarely all radiant.—Rocky banks, Penn. to Fla., west to Iowa and Mo.

2. **H. radiàta,** Walt. Leaves *densely tomentose and paler or white beneath.* — S. C. and Ga. to Tenn. and Mo.

### 11. DECUMÀRIA, L.

Flowers all fertile. Calyx-tube turbinate, 7 – 10-toothed, coherent with the ovary. Petals oblong, valvate in the bud. Stamens 20 – 30. Styles united into one, persistent Stigma thick, 7-10-rayed. Capsule 10-15-ribbed, 7-10-celled, many-seeded, bursting at the sides, the thin partitions at length separating into numerous chaffy scales. — A smooth climbing shrub, with opposite ovate or oblong entire or serrate leaves, no stipules, and numerous fragrant white flowers in compound terminal cymes. (Name said to be derived from *decem*, ten, referring to the fact of its being often 10-merous.)

1. **D. bárbara,** L. Leaves shining, sometimes pubescent; capsule with the persistent style and stigma urn-shaped, pendulous. — Banks of streams; Dismal Swamp, Va, to Fla. and La.

## 12. PHILADÉLPHUS, L. MOCK ORANGE OR SYRINGA.

Calyx-tube top-shaped, coherent with the ovary; the limb 4-5-parted, spreading, persistent, valvate in the bud. Petals rounded or obovate, large, convolute in the bud. Stamens 20-40. Styles 3-5. united below or nearly to the top. Stigmas oblong or linear. Capsule 3-5-celled, splitting at length into as many pieces. Seeds very numerous, on thick placentæ projecting from the axis, pendulous, with a loose membranaceous coat prolonged at both ends. — Shrubs, with opposite often toothed leaves, no stipules, and solitary or cymose-clustered showy white flowers. (An ancient name, applied by Linnæus to this genus for no obvious reason.)

1. **P. inodòrus,** L. *Glabrous;* leaves ovate or ovate-oblong, pointed, entire or with some spreading teeth; flowers single or few at the ends of the diverging branches, pure white, scentless; *calyx-lobes acute*, scarcely longer than the tube. — Mountains of Va. to Ga. and Ala.

2 **P. grandiflòrus,** Willd. A tall shrub, with long and recurved branches; like the last, but *somewhat pubescent*, with *larger flowers*, and the *calyx-lobes long and taper-pointed.* (P. inodorus, var. grandiflorus, *Gray.*) — Along streams, Va. to Fla. Often cultivated.

**P.** CORONÀRIUS, L., the common MOCK ORANGE OR SYRINGA of cultivation, from S. Eu., with cream-colored odorous flowers, has sometimes escaped.

## 13. ÍTEA, Gronov.

Calyx 5-cleft, free from the ovary or nearly so Petals 5, lanceolate, much longer than the calyx, and longer than the 5 stamens. Capsule oblong, 2-grooved, 2-celled, tipped with the 2 united styles, 2-parted (septicidal) when mature, several-seeded — Shrubs, with simple, alternate, petioled leaves, without stipules, and small white flowers in simple racemes. (Greek name of the Willow.)

1 **I. Virgínica,** L. Leaves deciduous, oblong, pointed, minutely serrate; seeds oval, flattish, with a crustaceous coat. — Wet places, Penn and N. J. to Fla., west to Mo and La

## 14. RÌBES, L. CURRANT. GOOSEBERRY.

Calyx 5-lobed, often colored; the tube coherent with the ovary. Petals 5, inserted in the throat of the calyx, small. Stamens 5, alternate with the petals. Ovary 1-celled, with 2 parietal placentæ and 2 distinct or united styles. Berry crowned with the shrivelled remains of the calyx, the surface of the numerous seeds swelling into a gelatinous outer coat investing a crustaceous one. Embryo minute at the base of hard albumen. — Low, sometimes prickly shrubs, with alternate and palmately-lobed leaves, which are plaited in the bud (except in one species), often fascicled on the branches; the small flowers from the same clusters, or from separate lateral buds. (From *riebs*, a German popular name for the currant. Grossularia was the proper name to have been adopted for the genus.)

§ 1. GROSSULÀRIA. (GOOSEBERRY.) *Stems mostly bearing thorns at the base of the leafstalks or clusters of leaves, and often with scattered bristly prickles; berries prickly or smooth.* (*Our species are indiscriminately called* WILD GOOSEBERRY; *the flowers greenish.*)

* *Peduncles 1–3-flowered; calyx as high as broad; leaves roundish-heart-shaped, 3–5-lobed.*

+ *Calyx-lobes decidedly shorter than the tube; berries apt to be prickly.*

1. **R. Cynósbati,** L. Stamens and undivided style not longer than the broadly bell-shaped calyx; berries large, armed with long prickles or rarely smooth. — Rocky woods, N. Brunswick to the mountains of N. C., and west to Minn. and Mo.

+ + *Calyx-lobes decidedly longer than the short and rather narrow tube; berries smooth, purple, sweet and pleasant.*

2. **R. grácile,** Michx. (MISSOURI GOOSEBERRY.) Spines often long, stout and red; *peduncles long and slender*; *flowers white* or whitish; filaments capillary, 4–6″ *long*, generally connivent or closely parallel, soon *conspicuously longer than the oblong-linear calyx-lobes.* (R. rotundifolium, *Man.*, in part.) — Mich. to Tenn., west to Tex., Minn., and the Rocky Mts.

3. **R. rotundifòlium,** Michx. Spines short; *peduncles short: flowers greenish* or the lobes dull purplish; filaments slender, 2–3″ *long, more or less exceeding the narrowly oblong-spatulate calyx-lobes.* — W. Mass. and N. Y., south in the Alleghanies to N. C.

4. **R. oxyacanthoìdes,** L. *Peduncles very short, flowers greenish or dull purplish: stamens usually scarcely equalling the rather broadly oblong calyx-lobes.* (R. hirtellum, *Michx.*) — Newf. to N. J., west to Ind., Minn., and westward. The common smooth-fruited gooseberry of the north, the whitish spines often numerous.

* * *Flowers several in a nodding raceme, small and flattish, greenish.*

5. **R. lacústre,** Poir. Young stems clothed with bristly prickles and with weak thorns; leaves heart-shaped, 3–5-parted, with the lobes deeply cut; calyx broad and flat; stamens and style not longer than the petals; fruit bristly (small, unpleasant). — Cold woods and swamps, Newf. to N. Eng., west to N. Y., Mich., and Minn.

§ 2. RIBÈSIA. (CURRANT.) *Thornless and prickless; racemes few–many-flowered, stamens short.*

6. **R. prostràtum,** L'Her. (FETID CURRANT.) Stems reclined; leaves deeply heart-shaped, 5–7-lobed, smooth, the lobes ovate, acute, doubly serrate; *racemes erect,* slender, calyx flattish; *pedicels and the* (*pale red*) *fruit glandular-bristly.* — Cold damp woods and rocks, Lab. to mountains of N. C., west to Mich., Minn., and the Rocky Mts.

7. **R. flóridum,** L'Her. (Wild Black Currant.) *Leaves sprinkled with resinous dots*, slightly heart-shaped, sharply 3–5-lobed, doubly serrate; *racemes drooping, downy; bracts longer than the pedicels;* flowers large, whitish; calyx tubular-bell-shaped, smooth; *fruit round-ovoid, black, smooth.* — Woods, N. Eng. to Va., west to Ky., Iowa, and Minn.

8. **R. rùbrum,** L., var. **subglandulòsum,** Maxim. (Red Currant.) Stems straggling or reclined; leaves somewhat heart-shaped, obtusely 3–5-lobed, serrate, downy beneath when young; *racemes from lateral buds distinct from the leaf-buds, drooping,* calyx flat (green or purplish); *fruit globose, smooth, red.* — Cold bogs and damp woods, N. Eng. to N. J., west to Ind. and Minn.

§ 3. SIPHÓCALYX. *Thornless and prickless; leaves convolute in the bud; racemes several-flowered; calyx-tube elongated; berry naked and glabrous.*

9. **R. aúreum,** Pursh. (Missouri or Buffalo Currant.) Shrub 5–12° high; leaves 3–5-lobed, rarely at all cordate; racemes short; flowers golden-yellow, spicy-fragrant; tube of salverform calyx (6″ long or less) 3 or 4 times longer than the oval lobes; stamens short; berries yellow or black. — Banks of streams, Mo. and Ark. to the Rocky Mts., and westward. Common in cultivation.

## Order 36. CRASSULÀCEÆ. (Orpine Family.)

*Succulent herbs, with perfectly symmetrical flowers; viz., the petals and pistils equalling the sepals in number* (3–20), *and the stamens the same or double their number,* — technically different from Saxifrageæ only in this complete symmetry, and in the carpels (in most of the genera) being quite distinct from each other. Also, instead of a perigynous disk, there are usually little scales on the receptacle, one behind each carpel. Fruit dry and dehiscent; the pods (follicles) opening down the ventral suture, many- rarely few-seeded. — Stipules none. Flowers usually cymose, small. Leaves mostly sessile, in Penthorum not at all fleshy.

* Not succulent; the carpels united, forming a 5-celled capsule.

1. **Penthorum.** Sepals 5. Petals none. Stamens 10. Pod 5-beaked, many-seeded.

* * Leaves, etc., thick and succulent. Carpels distinct.

2. **Tillæa.** Sepals, petals, stamens, and pistils 3 or 4. Seeds few or many.
3. **Sedum.** Sepals, petals, and pistils 4 or 5. Stamens 8-10. Seeds many.

### 1. PÉNTHORUM, Gronov. Ditch Stone-crop.

Sepals 5. Petals rare, if any. Stamens 10. Pistils 5, united below, forming a 5-angled, 5-horned, and 5-celled capsule, which opens by the falling off of the beaks, many-seeded. — Upright weed-like perennials (not fleshy like the rest of the family), with scattered leaves, and yellowish-green flowers loosely spiked along the upper side of the naked branches of the cyme. (Name from πέντε. *five*, and ὅρος, *a mark*, from the quinary order of the flower.)

1. **P. sedoìdes,** L. Leaves lanceolate, acute at both ends. — Open wet places; N. Brunswick to Fla., west to Minn., E. Kan., and Tex. July–Oct. Parts of the flower rarely in sixes or sevens.

## 2. TILLÆA, Mich.

Sepals, petals, stamens, and pistils 3 or 4. Pods 2 – many-seeded. — Very small tufted annuals, with opposite entire leaves and axillary flowers. (Named in honor of *Michael Angelo Tilli*, an early Italian botanist.)

1. **T. símplex,** Nutt. Rooting at the base (1 – 2′ high); leaves linear-oblong; flowers solitary, nearly sessile; calyx half the length of the (greenish-white) petals and the narrow 8 – 10-seeded pods, the latter with a scale at the base of each. — Muddy river-banks, Mass. to Md. July – Sept.

## 3. SÉDUM, Tourn. STONE-CROP. ORPINE.

Sepals and petals 4 or 5. Stamens 8 or 10. Follicles many-seeded; a little scale at the base of each. — Chiefly perennial, smooth, and thick-leaved herbs, with the flowers cymose or one-sided. Petals almost always narrow and acute or pointed. (Name from *sedeo*, to sit, alluding to the manner in which these plants fix themselves upon rocks and walls.)

* *Flowers perfect and sessile, as it were spiked along one side of spreading flowering branches or of the divisions of a scorpioid cyme, the first or central flower mostly* 5-*merous and* 10-*androus, the others often* 4-*merous and* 8-*androus.*

+ *Flowers white or purple.*

1. **S. pulchéllum,** Michx. Stems ascending or trailing (4 - 12′ high); *leaves terete, linear-filiform,* much crowded; spikes of the cyme several, densely flowered; *petals rose-purple.* — Va. to Ga., west to Ky., E. Kan., and Tex.; also cultivated in gardens. July.

2. **S. Névii,** Gray. Stems spreading, simple (3 – 5′ high); *leaves all alternate,* those of the sterile shoots *wedge-obovate or spatulate,* on flowering stems *linear-spatulate* and flattish; cyme about 3-spiked, densely flowered; *petals white,* more pointed than in the next; the flowering 3 or 4 weeks later; leaves and blossoms smaller. — Rocky cliffs, mountains of Va. to Ala.

3. **S. ternàtum,** Michx. Stems spreading (3 – 6′ high); *leaves flat, the lower whorled in threes, wedge-obovate,* the upper scattered, *oblong;* cyme 3-spiked, leafy; *petals white.* — Rocky woods, N. Y. to Ga., west to Ind. and Tenn.

+ + *Flowers yellow.*

**S.** ÀCRE, L. (MOSSY STONE-CROP.) Spreading on the ground, moss-like; leaves very small, alternate, almost imbricated on the branches, ovate, very thick; petals yellow. — Escaped from cultivation to rocky roadsides, etc. July. (Nat. from Eu.)

4. **S. Torrèyi,** Don. Annual; stems simple or branched from the base (2 – 4′ high); *leaves flat* or teretish, scattered, *oblong,* 2 – 3″ long; petals rather longer than the *ovate sepals;* carpels at length widely divergent. — Mo. to Ark. and Tex.

* * *Flowers in a terminal naked and regular cyme or cluster, more or less peduncled; leaves flat, obovate or oblong, mostly alternate.*

+ *Flowers perfect,* 5-*merous,* 10-*androus.*

5. **S. telephioìdes,** Michx. Stems ascending (6 – 12′ high), stout, leafy to the top; leaves oblong or oval, entire or sparingly toothed; cyme small; *petals flesh-color,* ovate-lanceolate, taper-pointed; *follicles tapering into a slender style.* — Dry rocks, from western New York to N. Ga. and S. Ind. June.

**S.** TELÉPHIUM, L. (GARDEN ORPINE or LIVE-FOR-EVER.) Stems erect (2° high), stout; leaves oval, obtuse, toothed; cymes compound; *petals purple,* oblong-lanceolate; *follicles abruptly pointed with a short style.* — Rocks and banks, escaped from cultivation in some places. July. (Adv. from Eu.)

**S.** REFLÉXUM, L. Glabrous, erect, 1° high; *leaves crowded, cylindric, subulate-tipped spreading or reflexed; flowers yellow,* pedicelled. — Coast of Mass.; western N. Y.; rare. (Nat. from Eu.)

+- +- *Flowers diœcious, mostly 4-merous and 8-androus.*

6. **S. Rhodiola,** DC. (ROSEROOT.) Stems erect (5 – 10′ high); leaves oblong or oval, smaller than in the preceding; flowers in a close cyme, greenish-yellow, or the fertile turning purplish. — Throughout Arctic America, extending southward to the coast of Maine, and cliffs of Delaware River; also in the western mountains. May, June. (Eu.)

## ORDER 37. DROSERÀCEÆ. (SUNDEW FAMILY)

*Bog-herbs, mostly glandular-haired, with regular hypogynous flowers, pentamerous and withering-persistent calyx, corolla, and stamens, the anthers fixed by the middle and turned outward, and a 1-celled capsule with twice as many styles or stigmas as there are parietal placentæ.* — Calyx imbricated. Petals convolute. Seeds numerous, anatropous, with a short and minute embryo at the base of the albumen. — Leaves circinate in the bud, i. e., rolled up from the apex to the base as in Ferns. A small family of insectivorous plants.

### 1. DRÓSERA, L. SUNDEW.

Stamens 5. Styles 3, or sometimes 5, deeply 2-parted so that they are taken for 6 or 10, slender, stigmatose above on the inner face. Capsule 3- (rarely 5-) valved; the valves bearing the numerous seeds on their middle for the whole length. — Low perennials or biennials; the leaves clothed with reddish gland-bearing bristles, in our species all in a tuft at the base; the naked scape bearing the flowers in a 1-sided raceme-like inflorescence, which nods at the undeveloped apex, so that the fresh-blown flower (which opens only in sunshine) is always highest. The plants yield a purple stain to paper. (The glands of the leaves exude drops of a clear glutinous fluid, glittering like dew-drops, whence the name, from δροσερός, *dewy.*)

1. **D. rotundifòlia,** L. (ROUND-LEAVED SUNDEW.) *Leaves orbicular,* abruptly narrowed into the *spreading hairy petioles;* seeds spindle-shaped, the coat loose and chaff-like; flowers white, the parts sometimes in sixes. — Peat-bogs, Lab. to Minn., Ind., and southward; common. July, Aug. (Eu.)

2. **D. intermèdia,** Hayne, var. **Americàna,** DC. *Leaves spatulate-oblong,* tapering into the long rather *erect naked petioles;* seeds oblong, with a rough close coat; flowers white. (D. longifolia, *Gray,* Manual.) — Bogs, with the same range but less common. June – Aug. — Plant raised on its prolonged caudex when growing in water. (Eu.)

3. **D. lineàris,** Goldie. (SLENDER SUNDEW.) *Leaves linear,* obtuse, the blade (2 – 3′ long, scarcely 2″ wide) *on naked erect petioles* about the same length; seeds oblong, with a smooth and perfectly close coat; flowers white. — Shore of L. Superior, Mich., and Minn.

4. **D. filifórmis,** Raf. (THREAD-LEAVED SUNDEW.) *Leaves very long and filiform,* erect, with no distinction between blade and stalk; seeds spindle-shaped; flowers numerous, purple rose-color (½′ broad). — Wet sand, near the coast, Mass. to N. J. and Fla.

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DIONÆA MUSCÍPULA, Ellis, the VENUS'S FLY-TRAP, — so noted for the extraordinary irritability of its leaves, closing quickly at the touch, — is a native of the sandy savannas of the eastern part of N. C. It differs in several respects from the character of the order given above; the stamens being 15, the styles united into one, and the seeds all at the base of the pod.

## ORDER 38. HAMAMELÍDEÆ. (WITCH-HAZEL FAMILY.)

*Shrubs or trees, with alternate simple leaves and deciduous stipules, flowers in heads or spikes, often polygamous or monœcious; the calyx cohering with the base of the ovary, which consists of 2 pistils united below, and forms a 2-beaked, 2-celled woody capsule, opening at the summit, with a single bony seed in each cell, or several, only one or two of them ripening.* — Petals inserted on the calyx, narrow, valvate or involute in the bud, or often none at all. Stamens twice as many as the petals, and half of them sterile and changed into scales, or numerous. Seeds anatropous. Embryo large and straight, in scanty albumen; cotyledons broad and flat.

* Flowers with a manifest calyx, or calyx and corolla, and a single ovule suspended from the summit of each cell.

1. **Hamamelis.** Petals 4, strap-shaped. Stamens and scales each 4, short.
2. **Fothergilla.** Petals none. Stamens about 24, long; filaments thickened upward.

* * Flowers naked, with barely rudiments of a calyx and no corolla, crowded into catkin-like heads. Ovules several or many in each cell.

3. **Liquidambar.** Monœcious or polygamous. Stamens very numerous. Capsules consolidated by their bases in a dense head.

### 1. HAMAMÈLIS, L. WITCH-HAZEL.

Flowers in little axillary clusters or heads, usually surrounded by a scale-like 3-leaved involucre. Calyx 4-parted, and with 2 or 3 bractlets at its base. Petals 4, strap-shaped, long and narrow, spirally involute in the bud. Stamens 8, very short; the 4 alternate with the petals anther-bearing, the others imperfect and scale-like. Styles 2, short. Capsule opening loculicidally from the top; the outer coat separating from the inner, which encloses the single large and bony seed in each cell, but soon bursts elastically into two pieces. — Tall shrubs, with straight-veined leaves, and yellow, perfect or polygamous flowers. (From *ἅμα, at the same time with,* and *μηλίς, an apple-tree;* a name anciently applied to the Medlar, or some similar tree.)

1. **H. Virginiàna,** L. Leaves obovàte or oval, wavy-toothed, somewhat downy when young; blossoming late in autumn, when the leaves are falling, and maturing its seeds the next summer. — Damp woods, N. Scotia to Fla., west to E. Minn. and La.

### 2. FOTHERGÍLLA, L.

Flowers in a terminal catkin-like spike, mostly perfect. Calyx bell shaped, the summit truncate, slightly 5–7-toothed. Petals none. Stamens about 24, borne on the margin of the calyx in one row, all alike; filaments very long, thickened at the top (white). Styles 2, slender. Capsule cohering with the base of the calyx, 2-lobed, 2-celled, with a single bony seed in each cell. — A low shrub; the oval or obovate leaves smooth, or hoary underneath, toothed at the summit; the flowers appearing rather before the leaves, each partly covered by a scale-like bract. (Dedicated to the distinguished *Dr. John Fothergill.*)

1. **F. Gardèni,** L. (F. alnifolia, *L. f.*) — Low grounds, Va. to N. C. April, May.

### 3. LIQUIDÁMBAR, L. SWEET-GUM TREE.

Flowers usually monœcious, in globular heads or catkins; the sterile arranged in a conical cluster, naked; stamens very numerous, intermixed with minute scales; filaments short. Fertile flowers consisting of many 2-celled 2-beaked ovaries, subtended by minute scales in place of a calyx, all more or less cohering together and hardening in fruit, forming a spherical catkin or head; the capsules opening between the 2 awl-shaped beaks. Styles 2, stigmatic down the inner side. Ovules many, but only one or two perfecting. Seeds with a wing-angled seed-coat. — Catkins racemed, nodding, in the bud enclosed by a 4-leaved deciduous involucre. (A mongrel name, from *liquidus,* fluid, and the Arabic *ambar,* amber; in allusion to the fragrant terebinthine juice which exudes from the tree.)

1. **L. Styracíflua,** L. (SWEET GUM. BILSTED.) Leaves rounded, deeply 5 – 7-lobed, smooth and shining, glandular-serrate, the lobes pointed. — Moist woods, from Conn. to S. Ill., and south to Fla. and Tex. April. — A large and beautiful tree, with fine-grained wood, the gray bark commonly with corky ridges on the branchlets. Leaves fragrant when bruised, turning deep crimson in autumn. The woody pods filled mostly with abortive seeds, resembling sawdust.

## ORDER 39. HALORÀGEÆ. (WATER-MILFOIL FAMILY.)

*Aquatic or marsh plants* (*at least in northern countries*), *with the inconspicuous symmetrical* (perfect or unisexual) *flowers sessile in the axils of leaves or bracts, calyx-tube coherent with the ovary* (or calyx and corolla wanting in Callitriche), *which consists of* 2 – 4 *more or less united carpels* (or in Hippuris of only one carpel), *the styles or sessile stigmas distinct.* Limb of the calyx obsolete or very short in fertile flowers. Petals small or none. Stamens 1 – 8. Fruit indehiscent, 1 – 4-celled, with a single anatropous seed suspended from the summit of each cell. Embryo in the axis of fleshy albumen; cotyledons minute.

1. **Myriophyllum.** Flowers monœcious or polygamous, the parts in fours, with or without petals. Stamens 4 or 8. Leaves often whorled, the immersed pinnately dissected.
2. **Proserpinaca.** Flowers perfect, the parts in threes. Petals none. Leaves alternate, the immersed pinnately dissected.
3. **Hippuris.** Flowers usually perfect. Petals none. Stamen, style, and cell of the ovary only one. Leaves entire, in whorls.
4. **Callitriche.** Flowers monœcious. Calyx and petals none. Stamen 1. Ovary 4-celled, with 2 filiform styles. Leaves entire, opposite.

## 1. MYRIOPHÝLLUM, Vaill. WATER-MILFOIL.

Flowers monœcious or polygamous Calyx of the sterile flowers 4-parted, of the fertile 4-toothed. Petals 4, or none. Stamens 4 – 8. Fruit nut-like, 4-celled, deeply 4-lobed; stigmas 4, recurved. — Perennial aquatics. Leaves crowded, often whorled; those under water pinnately parted into capillary divisions. Flowers sessile in the axils of the upper leaves, usually above water in summer; the uppermost staminate. (Name from *μυρίος, a thousand*, and *φύλλον, a leaf*, i. e., Milfoil.)

* *Stamens* 8; *petals deciduous; carpels even; leaves whorled in threes or fours.*

1. **M. spicàtum,** L. Leaves all pinnately parted and capillary, except the *floral ones or bracts;* these *ovate, entire or toothed, and chiefly shorter than the flowers,* which thus form an interrupted spike. — Deep water, Newf. to N. Eng. and N. Y., west to Minn., Ark., and the Pacific. (Eu.)

2. **M. verticillàtum,** L. *Floral leaves much longer than the flowers, pectinate-pinnatifid;* otherwise nearly as n. 1. — Ponds, etc., common. (Eu.)

* * *Stamens* 4; *petals rather persistent; carpels* 1 – 2-*ridged and roughened on the back; leaves whorled in fours and fives, the lower with capillary divisions.*

3. **M. heterophýllum,** Michx. Stem stout; *floral leaves ovate and lanceolate,* thick, crowded, sharply serrate, the lowest pinnatifid; *fruit obscurely roughened.* — Lakes and rivers, Ont. and N. Y. to Fla., west to Minn. and Tex.

4. **M. scabràtum,** Michx. Stem rather slender; lower leaves pinnately parted with few capillary divisions; *floral leaves linear* (rarely scattered), *pectinate-toothed or cut-serrate; carpels strongly* 2-*ridged and roughened on the back.* — Shallow ponds, S. New Eng. to S. C., west to Mo. and La.

* * * *Stamens* 4; *petals rather persistent; carpels even on the back, leaves chiefly scattered, or wanting on the flowering stems.*

5. **M. ambíguum,** Nutt. *Immersed leaves pinnately parted* into about 10 very delicate capillary divisions; the *emerging ones pectinate, or the upper floral linear* and sparingly toothed or entire; *flowers mostly perfect:* fruit (minute) smooth. — Ponds and ditches, Mass. to N. J. and Penn.; also in Ind. — Var. CAPILLÀCEUM, Torr. & Gray, has stems floating, long and very slender, and leaves all immersed and capillary. Var. LIMÒSUM, Torr., is small, rooting in the mud, with leaves all linear, incised, toothed, or entire.

6. **M. tenéllum,** Bigelow. *Flowering stems nearly leafless and scape-like* (3 – 10′ high), erect, simple; the sterile shoots creeping and tufted, bracts small, entire; *flowers alternate, monœcious;* fruit smooth. — Borders of ponds, Newf. to N. Eng., west to Mich.

## 2. PROSERPINÀCA, L. MERMAID-WEED.

Flowers perfect. Calyx-tube 3-sided, the limb 3-parted. Petals none. Stamens 3. Stigmas 3, cylindrical. Fruit bony, 3-angled, 3-celled, 3-seeded, nut-like. — Low, perennial herbs, with the stems creeping at base, alternate leaves, and small flowers sessile in the axils, solitary or 3 – 4 together, in summer. (Name applied by Pliny to a Polygonum, meaning *pertaining to Proserpine.*)

1. **P. palústris,** L. *Leaves lanceolate, sharply serrate,* the lower pectinate when under water; fruit sharply angled. — Wet swamps, N. Eng. to Fla., west to Minn. and Tex.

2. **P. pectinàcea,** Lam. *Leaves all pectinate*, the divisions linear-awl-shaped; fruit rather obtusely angled. — Sandy swamps, near the coast, Mass. to Fla. and La.

### 3. HIPPÙRIS, L. MARE'S TAIL.

Flowers perfect or polygamous. Calyx entire. Petals none. Stamen one, inserted on the edge of the calyx. Style single, thread-shaped, stigmatic down one side, received in the groove between the lobes of the large anther. Fruit nut-like, 1-celled, 1-seeded. — Perennial aquatics, with simple entire leaves in whorls, and minute flowers sessile in the axils in summer. (Name from ἵππος, *a horse*, and οὐρά, *a tail*.)

1. **H. vulgàris,** L. Stems simple (1 – 2° high); leaves in whorls of 8 or 12, linear, acute; fruit nearly 1″ long. — Ponds and springs, Penn. to Ind. and Minn., and northward. (Eu.)

### 4. CALLÍTRICHE, L. WATER-STARWORT.

Flowers monœcious, solitary or 2 or 3 together in the axil of the same leaf, wholly naked or between a pair of membranaceous bracts. Sterile flower a single stamen; filament bearing a heart-shaped 4-celled anther, which by confluence becomes 1-celled, and opens by a single slit. Fertile flower a single 4-celled ovary, either sessile or pedicelled, bearing 2 distinct and filiform sessile. usually persistent stigmas. Fruit nut-like, compressed, 4-lobed, 4-celled, separating at maturity into as many closed 1-seeded portions. Seed pendulous, filling the cell; embryo slender, straight or slightly curved, nearly the length of the oily albumen. — Low, slender and usually tufted, glabrous, or beset with minute (microscopic) stellate scales, with spatulate or linear entire leaves, both forms of leaves often occurring on the same stem. (Name from καλός, *beautiful*, and θρίξ, *hair*, from the often almost capillary stems.)

* *Small annuals, forming tufts on moist soil, destitute of stellate scales; leaves uniform, very small, obovate or oblanceolate, 3-nerved, crowded; bracts none.*

1. **C. defléxa,** Braun, var. **Austìni,** Hegelm. Stems ½ – 1′ high; fruit small (⅓″ broad), broader than high, deeply notched above and below, on a pedicel often nearly of its own length or nearly sessile; lobes of the fruit narrowly winged and with a deep groove between them; persistent stigmas shorter than the fruit, spreading or reflexed; leaves 1 – 2″ long. (C. Austini, *Engelm.*) — On damp soil, N. Y. and N. J. to Ill., Mo., and Tex. (S. Am.)

* * *Amphibious perennials; leaves with stellate scales, the floating ones obovate and 3-nerved, the submersed linear (all uniform and narrow in terrestrial forms): flowers usually between a pair of bracts.*

2. **C. vérna,** L. Fruit (½″ long) higher than broad, obovate, slightly obcordate, usually thickest at the base, sessile, its lobes sharply keeled or very narrowly winged above, and with a wide groove between them; stigmas shorter than the fruit, almost erect, usually deciduous; floating leaves crowded in a tuft, obovate, narrowed into a petiole. — Common in stagnant waters, New England to Fla., west to Minn., Tex., and the Pacific. (Eu.)

3. **C. heterophýlla,** Pursh. Fruit smaller, as broad or broader than high, deeply emarginate, thick, almost ventricose, sessile or nearly so, its lobes

obtusely angled, with a small groove between them; stigmas as long as the fruit, erect, persistent; floating leaves crowded in a tuft, broadly spatulate, often retuse, abruptly narrowed into a long petiole. — Stagnant water, Mass. and N. J. to S. Ind. and Mo.

* * * *Submersed perennial, with numerous uniform linear* 1-*nerved leaves; flowers without bracts; carpels separate nearly to the axis.*

4. **C. autumnàlis,** L. Stems 3 – 6′ high; fruit large (1″ wide or more), flattened, circular, deeply and narrowly notched, sessile or nearly so, its lobes broadly winged, and with a very deep and narrow groove between them; stigmas very long, reflexed, deciduous; leaves all linear from a broader base, retuse or notched at the tip (2 – 6″ long). — W. Mass., Lake Champlain and N. New York, Lake Superior, and westward. (Eu.)

## ORDER 40. MELASTOMÀCEÆ. (MELASTOMA FAMILY.)

*Plants with opposite* 3 – 7-*ribbed leaves, and definite stamens, the anthers opening by pores at the apex; otherwise much as in the* Onagraceæ. — All tropical, except the genus

### 1. RHÉXIA, L. DEER-GRASS. MEADOW-BEAUTY.

Calyx-tube urn-shaped, coherent with the ovary below, and continued above it, persistent, 4-cleft at the apex. Petals 4, convolute in the bud, oblique, inserted along with the 8 stamens on the summit of the calyx-tube. Anthers long, 1-celled, inverted in the bud. Style 1; stigma 1. Capsule invested by the permanent calyx, 4-celled, with 4 many-seeded placentæ projecting from the central axis. Seeds coiled like a snail-shell, without albumen. — Low perennial herbs, often bristly, with mostly sessile 3 – 5-nerved and bristly-edged leaves, and large showy cymose flowers; in summer; the petals falling early. (A name in Pliny for some unknown plant, probably from ῥῆξις, *a crevice*, from the place of growth.)

* *Anthers linear, curved, with a minute spur on the back at the attachment of the filament above its base; flowers cymose, peduncled.*

1. **R. Virgínica,** L. *Stem square,* with wing-like angles; *leaves oval-lanceolate, sessile, acute;* calyx-tube and pedicels more or less hispid with gland-tipped hairs; petals bright purple. — Sandy swamps; coast of Maine to Fla., west to northern N. Y., Ind., Mo., and La. Slender rootstocks tuberiferous.

2. **R. aristòsa,** Britt. Branches somewhat wing-angled; leaves linear-oblong, sessile, not narrowed at base, naked or very sparsely hairy; hairs of the calyx mostly below the throat, not gland-tipped; petals sparsely villous, bright purple. — Egg Harbor City, N. J. (*J. E. Peters*); also Sumter Co., S. C. (*J. D. Smith*).

3. **R. Mariàna,** L. *Stems cylindrical; leaves linear-oblong,* narrowed below, mostly petiolate; petals paler. — Sandy swamps; N. J. to Fla., west to Mo. and La.

* * *Anthers oblong, straight, without any spur; flowers few, sessile.*

4. **R. ciliòsa,** Michx. Stem square, glabrous; leaves broadly ovate, ciliate with long bristles; calyx glabrous. — Md. to Fla. and La.

## ORDER 41. LYTHRÀCEÆ. (LOOSESTRIFE FAMILY.)

*Herbs, with mostly opposite entire leaves, no stipules, the calyx enclosing but free from the* 1 – 4-*celled many-seeded ovary and membranous capsule, and bearing the* 4 – 7 *deciduous petals and* 4 – 14 *stamens on its throat; the latter lower down. Style* 1; *stigma capitate, or rarely 2-lobed.* — Flowers axillary or whorled, rarely irregular, perfect, sometimes dimorphous or even trimorphous, those on different plants with filaments and style reciprocally longer and shorter. Petals sometimes wanting. Capsule often 1-celled by the early breaking away of the thin partitions; placentæ in the axis. Seeds anatropous, without albumen. — Branches usually 4-sided.

* Flowers regular or nearly so.

+ Flowers mostly solitary in the axils of the leaves, sessile or nearly so.

1. **Didiplis.** Calyx short, without appendages. Petals none. Stamens 4. Capsule indehiscent. Small aquatic.
2. **Rotala.** Calyx short, the sinuses appendaged. Petals and stamens 4. Capsule septicidal, with 3 - 4 valves.
3. **Ammannia.** Flowers not trimorphous. Petals generally 4 or none. Stamens 4. Capsule bursting irregularly.

+ + Flowers in 3 - many-flowered axillary cymes (rarely solitary).

4. **Lythrum.** Calyx tubular. Petals usually 6. Stamens mostly 6 or 12. Flowers cymose-spicate in one species.
5. **Decodon.** Flowers trimorphous. Petals 5 (rarely 4). Stamens 8 - 10. Capsule 3 - 4-valved, loculicidal.

* * Flowers irregular and unsymmetrical, with 6 petals and 11 stamens.

6. **Cuphea.** Calyx spurred or enlarged on one side at base. Petals unequal.

### 1. DIDÍPLIS, Raf. WATER PURSLANE.

Calyx short-campanulate or semiglobose, with no appendages at the sinuses (or a mere callous point). Petals none. Stamens 4, short. Capsule globular, indehiscent, 2-celled. — Submersed aquatic (sometimes terrestrial), rooting in the mud, with opposite linear leaves, and very small greenish flowers solitary in their axils. ("Didiplis means *two doubling;*" from δίς, *twice,* and διπλόος, *double.*)

1. **D. lineàris,** Raf. Leaves when submersed elongated, thin, closely sessile by a broad base, when emersed shorter and contracted at base; calyx with broad triangular lobes; style very short; capsules very small. (Ammannia Nuttallii, *Gray.*) — From Minn. and Wisc. to Tex., east to N. C. and Fla.

### 2. ROTÀLA, L.

Calyx short-campanulate or semiglobose, with tooth-like appendages at the sinuses (abnormally, in our species). Petals 4 (in ours). Stamens 4, short. Capsule globular, 4-celled, septicidal, the valves (under a strong lens) transversely and densely striate. (Name a diminutive of *rota*, a wheel, from the whorled leaves of the original species.)

1. **R. ramòsior,** Koehne. Leaves tapering at base or into a short petiole, linear-oblanceolate or somewhat spatulate; flowers solitary (rarely 3) in the axils and sessile; accessory teeth of calyx as long as the lobes or shorter.

(Ammannia humilis, *Michx.*) — Low or wet ground, Mass. to Fla., west to Ind., Kan., and Tex. — With Ammannia-like habit, an exception in the genus.

### 3. AMMÁNNIA, Houston.

Flowers in 3 – many-flowered axillary cymes. Calyx globular or bell-shaped, 4-angled, 4-toothed, usually with a little horn-shaped appendage at each sinus. Petals 4 (purplish), small and deciduous, sometimes wanting. Stamens 4 – 8. Capsule globular, 2 – 4-celled, bursting irregularly. — Low and inconspicuous smooth herbs, with opposite narrow leaves, and small flowers in their axils, produced all summer. (Named after *Paul Ammann*, a German botanist anterior to Linnæus.)

1. **A. coccinea,** Rottb. Leaves linear-lanceolate (2 – 3′ long), with a broad auricled sessile base; cymes subsessile, dense; petals purplish; stamens more or less exserted; style usually slender; capsule included. (A. latifolia, *Gray*, Manual, not *L.*) — N. J. to Fla., west to S. Ind., Kan., and Tex. The style varies much in length, sometimes in the same specimen. Apparently the more developed form of the southern A. latifolia, Linn., which, as limited by Koehne, has apetalous flowers, with included stamens and short style.

### 4. LÝTHRUM, L. Loosestrife.

Calyx cylindrical, striate, 5 – 7-toothed, with as many little processes in the sinuses. Petals 5 – 7. Stamens as many as the petals or twice the number, inserted low down on the calyx, commonly nearly equal. Capsule oblong, 2-celled. — Slender herbs, with opposite or scattered mostly sessile leaves, and purple (rarely white) flowers; produced in summer. (Name from λύθρον, *blood;* perhaps from the styptic properties of some species.)

* *Stamens and petals* 5 – 7; *flowers small, solitary and nearly sessile in the axils of the mostly scattered upper leaves; proper calyx-teeth often shorter than the intermediate processes; plants smooth.*

1. **L. Hyssopifòlia,** L. Low annual (6 – 10′ high), pale; leaves oblong-linear, obtuse, longer than the inconspicuous flowers; petals pale-purple; stamens usually 4 – 6, included. — Marshes, near the coast, Maine to N. J. (Eu.)

2. **L. lineàre,** L. Stem slender and tall (3 – 4° high), bushy at top, *with 2 margined angles; leaves linear, chiefly opposite;* petals whitish; flowers with 6 included stamens and a short style, or the stamens exserted and style short; *ovary on a thick short stalk; no fleshy hypogynous ring.* — Brackish marshes, N. J. to Fla. and Tex.

3. **L. alàtum,** Pursh. Tall and wand-like perennial; *branches with margined angles; leaves oblong-ovate to linear-lanceolate, acute, with a cordate or rounded base,* the upper mostly *alternate; calyx* 2 – 4″ *long;* petals rather large, deep-purple; *stamens of the short-styled flowers exserted; fleshy hypogynous ring prominent.* — Ont. to Minn., south to Ga., Ark., and Col.; also near Boston.

* * *Stamens* 12 (*rarely* 8 *or* 10), *twice the number of the petals,* 6 *longer and* 6 *shorter; flowers large, crowded and whorled in an interrupted spike.*

**L. Salicària,** L. (Spiked Loosestrife.) More or less downy and tall; leaves lanceolate, heart-shaped at base, sometimes whorled in threes; flowers purple, trimorphous in the relative lengths of the stamens and style. — Wet meadows, N. Scotia to Del. (Nat. from Eu.)

### 5. DÉCODON, Gmel. Swamp Loosestrife.

Calyx short, broadly bell-shaped or hemispherical, with 5 – 7 erect teeth, and as many longer and spreading horn-like processes at the sinuses. Petals 5. Stamens 10 (rarely 8), exserted, of two lengths. Capsule globose, 3 – 5-celled, loculicidal. — Perennial herbs or slightly shrubby plants, with opposite or whorled leaves, and axillary clusters of trimorphous flowers. (Name from *δέκα, ten,* and *ὀδούς, tooth.*)

1. **D. verticillàtus,** Ell. Smooth or downy; stems recurved (2 – 8° long), 4 – 6-sided; leaves lanceolate, nearly sessile, opposite or whorled, the upper with clustered flowers in their axils on short pedicels; petals 5, wedge-lanceolate, rose-purple (½′ long); stamens 10, half of them shorter. (Nesæa verticillata, *HBK.*) — Swampy grounds, N. Eng. to Fla., west to Ont., Minn., and La. Bark of the lower part of the stem often spongy-thickened.

### 6. CÙPHEA, Jacq.

Calyx tubular, 12-ribbed, somewhat inflated below, gibbous or spurred at the base on the upper side, 6-toothed at the apex, and usually with as many little processes in the sinuses. Petals 6, very unequal. Stamens mostly 12, approximate in 2 sets, included, unequal. Ovary with a curved gland at the base next the spur of the calyx, 1 – 2-celled; style slender; stigma 2-lobed. Capsule oblong, few-seeded, early ruptured through one side. — Flowers solitary or racemose, stalked. (Name from *κυφός, gibbous,* from the shape of the calyx.)

1. **C. viscosíssima,** Jacq. (Clammy Cuphea.) Annual, very viscid-hairy, branching; leaves ovate-lanceolate; petals ovate, short-clawed, purple; seeds flat, borne on one side of the placenta, which is early forced out of the ruptured capsule. — Dry fields, R. I. to Ga., west to Kan. and La.

## Order 42. ONAGRÀCEÆ. (Evening-Primrose Family.)

*Herbs, with 4-merous (sometimes 2 – 3- or 5 – 6-merous) perfect and symmetrical flowers; the tube of the calyx cohering with the 2 – 4-celled ovary, its lobes valvate in the bud, or obsolete, the petals convolute in the bud, sometimes wanting; and the stamens as many or twice as many as the petals or calyx-lobes,* inserted on the summit of the calyx-tube. Style single, slender; stigma 2 – 4-lobed or capitate. Pollen grains often connected by cobwebby threads. Seeds anatropous, small, without albumen. — Mostly herbs, with opposite or alternate leaves. Stipules none or glandular.

* Parts of the flower in fours or more.

+ Fruit a many-seeded pod, usually loculicidal.

++ Calyx-limb divided to the summit of the ovary, persistent.

1. **Jussiæa.** Petals 4 - 6. Stamens twice as many. Capsule elongated.
2. **Ludwigia.** Petals 4 or none. Stamens 4. Capsule short.

++ ++ Calyx-tube prolonged beyond the ovary (scarcely so in n 3) and deciduous from it. Flowers 4-merous.

3. **Epilobium.** Seeds silky-tufted. Flowers small, not yellow. Lower leaves often opposite.
4. **Œnothera.** Seeds naked. Flowers mostly yellow. Leaves alternate

+– +– Fruit dry and indehiscent, 1 - 4-seeded. Leaves alternate.

5. **Gaura.** Calyx-tube obconical. Filaments appendaged at base.
6. **Stenosiphon.** Calyx-tube filiform. Filaments not appendaged.

* * Parts of the flower in twos. Leaves opposite.

7. **Circæa.** Petals 2, obcordate or 2-lobed. Stamens 2. Fruit 1 - 2-seeded, bristly.

## 1. JUSSIÆA, L.

Calyx-tube elongated, not at all prolonged beyond the ovary; the lobes 4 - 6, herbaceous and persistent. Petals 4 - 9. Stamens twice as many as the petals. Capsule 4 - 6-celled, usually long, opening between the ribs. Seeds very numerous. — Herbs (ours glabrous perennials), with mostly entire and alternate leaves, and axillary yellow flowers, in summer. (Dedicated to *Bernard de Jussieu*, the founder of the Natural System of Botany.)

1. **J. decúrrens,** DC. *Stem erect* (1 - 2° high), branching, *winged* by the decurrent lanceolate leaves; *calyx-lobes* 4, as long as the petals; *capsule oblong-club-shaped, wing-angled;* seeds in several rows in each cell. — Wet places, Va. to Fla., west to S. Ill., Ark., and La.

2. **J. rèpens,** L. *Stem creeping, or floating and rooting; leaves oblong, tapering into a slender petiole;* flowers large, long-peduncled; *calyx-lobes and obovate petals* 5; pod woody, cylindrical, with a tapering base; seeds quadrate, in 1 row in each cell, adherent to the spongy endocarp. — In water, Ill. and Ky. to E. Kan., Ark., and Tex.

## 2. LUDWÍGIA, L. FALSE LOOSESTRIFE.

Calyx-tube not at all prolonged beyond the ovary; the lobes 4, usually persistent. Petals 4, often small or wanting. Stamens 4. Capsule short or cylindrical, many-seeded. Seeds minute, naked. — Perennial herbs, with axillary (rarely capitate) flowers, through summer and autumn. (Named for *C. G. Ludwig*, Professor of Botany at Leipsic, contemporary with Linnæus.)

* *Leaves all alternate, sessile or nearly so.*

+– *Flowers peduncled in the upper axils, with conspicuous yellow petals* (4 - 8″ *long*), *equalling the ovate or lanceolate foliaceous lobes of the calyx.*

1. **L. alternifòlia,** L. (SEED-BOX.) *Smooth* or nearly so, branched (3° high); *leaves lanceolate to linear-lanceolate, acute or pointed at both ends;* capsules cubical, rounded at base, wing-angled. — Swamps, E. Mass. to Fla., west to Mich., E. Kan., and La.

2. **L. hirtélla,** Raf. *Hairy* all over; stems nearly simple (1 - 2° high); *leaves oblong, or the upper lanceolate, blunt at both ends;* capsules nearly as in the last, but scarcely wing-angled. — Moist pine barrens, N. J. to Fla. and Tex.

+– +– *Flowers small, sessile* (*solitary or sometimes clustered*) *in the axils, with very small greenish petals* (*in* n. 5) *or mostly none; leaves mostly lanceolate or linear on the erect stems* (1 - 3° *high*) *and numerous branches; but prostrate or creeping sterile shoots often produced from the base, thickly beset with shorter obovate or spatulate leaves.* (*Our species glabrous, except* n. 3.)

3. **L. sphærocárpa,** Ell. Minutely pubescent, especially the calyx, or nearly glabrous; leaves lanceolate or linear, acute, tapering at base, those of the runners obovate with a wedge-shaped base and glandular-denticulate;

*bractlets minute, obsolete, or none; capsules globular or depressed* (sometimes acute at base), not longer than the calyx-lobes (less than 2″ long). — Water or wet swamps, E. Mass. to Fla. and La. Bark below often spongy-thickened.

4. **L. polycárpa,** Short & Peter. Leaves narrowly lanceolate, acute at both ends, those of the runners oblong-spatulate, acute, entire; *bractlets linear-awl-shaped and conspicuous on the base of the* 4-*sided somewhat top-shaped capsule,* which is longer than the calyx-lobes. — Wet places, E. Mass. and Conn. to Mich., Minn., E. Kan., and Ky.

5. **L. lineàris,** Walt. Slender, mostly low; leaves narrowly linear, those of the short runners obovate; minute petals usually present; *bractlets minute at the base of the elongated top-shaped* 4-*sided capsule,* which is 3″ long and much longer than the calyx-lobes. — Bogs, pine barrens of N. J., and southward.

6. **L. cylíndrica,** Ell. Much branched; leaves oblong- or spatulate-lanceolate, much tapering at the base or even petioled; *bractlets very minute at the base of the cylindrical capsule,* which is 3″ long, and several times exceeds the calyx-lobes. — Swamps, S. Ill. to Fla. and Tex.

* * *Leaves all opposite; stems creeping or floating.*

7. **L. palústris,** Ell. (Water Purslane.) Smooth; leaves ovate or oval, tapering into a slender petiole; petals none, or small and reddish when the plant grows out of water; calyx-lobes very short; capsules oblong, 4-sided, not tapering at base, sessile in the axils (2″ long). — Ditches, common. (Eu.)

8. **L. arcuàta,** Walt. Smooth, small and creeping; leaves oblanceolate, nearly sessile; flowers solitary, long-peduncled; petals yellow, exceeding the calyx (3″ long); capsules oblong-club-shaped, somewhat curved (½′ long). — Swamps, Va. to Fla.

### 3. EPILÒBIUM, L. Willow-herb.

Calyx-tube not or scarcely prolonged beyond the ovary; the limb 4-cleft or -parted, deciduous. Petals 4. Stamens 8; anthers short. Capsule linear, many-seeded. Seeds with a tuft of long hairs at the end. — Mostly perennials, with nearly sessile leaves, and violet, purple, or white flowers; in summer. A large genus, many of its species of difficult limitation. The following provisional arrangement has been made by Prof. W. Trelease, mainly in accordance with Haussknecht's revision of the genus. (Name composed of ἐπί, *upon,* and λόβιον, *a little pod.*)

§ 1. *Flowers large, purple, in a long raceme; calyx-limb deeply parted; petals entire; stamens and style successively deflexed; stigma of* 4 *long lobes.*

1. **E. angustifòlium,** L. (Great Willow-herb. Fire-weed.) Stem simple, tall (4–7°); leaves scattered, ample, lanceolate, nearly entire. — Low grounds, especially in newly cleared lands; N. Eng. to N. C., west to Minn. and E. Kan., and far north and westward. (Eu., Asia.)

§ 2. *Flowers mostly small and corymbed or panicled; calyx-limb* 4-*cleft; petals mostly deeply notched; stamens and style erect.*

* *Stigma* 4-*parted; stem terete.*

**E.** hirsùtum, L. Densely soft-hairy, stout, branching (3 - 5° high); leaves mostly opposite, lance-oblong, serrulate, sessile, flowers in the upper axils or in a leafy short raceme; petals 6″ long, rose-purple. — Waste grounds, Mass. to N. Y. and Ont. (Nat. from Eu.)

* * *Stigma clavate; stem terete, without decurrent lines* (*or with traces in* n. 2); *leaves numerous, the lower opposite, subentire, with revolute margins.*

2. **E. lineàre,** Muhl. Usually much branched above and minutely hoary-pubescent, 1 – 2° high; leaves linear-lanceolate, tapering to a short but distinct petiole, acutish; flowers numerous, pale; capsules hoary, on pedicels as long as the leaves. (E. palustre, var. lineare, *Gray*, mainly.) — Bogs, N. Eng. to Penn., Iowa, and northward.

3. **E. stríctum,** Muhl. Erect, 1 – 2½° high, densely beset with soft spreading somewhat glandular white hairs; leaves broader, more obtuse and with evident veins, very short-petioled or sessile; pubescence of the capsule soft and spreading. (E. molle, *Torr.*) — Bogs, Mass. to Minn., south to Va. and Ill.

* * *Stigma clavate; stem somewhat quadrangular with* 2 – 4 *ridges or hairy lines decurrent from some of the leaves.*

+ *Tall and mostly branching, many-flowered; leaves rather large, toothed, not revolute, the lower opposite; seeds papillose.*

4. **E. coloràtum,** Muhl. Somewhat hoary-pubescent above or glandular, 1 – 3° high; leaves lanceolate, sharply serrulate or denticulate, acute, narrowed to conspicuous petioles; flowers pale, more or less nodding; peduncles shorter than the leaves; seeds dark, unappendaged; coma cinnamon-color. — Wet places, common.

5. **E. adenocaùlon,** Haussk. Differs in its more glandular pubescence above, the often blunter and less toothed leaves abruptly contracted to shorter petioles, flowers erect, paler seeds with a slight prolongation at top, and a merely dingy coma. — Wet places through the Northern States.

6. **E. glandulòsum,** Lehm. Subsimple; pubescence above not glandular; leaves ovate-lanceolate, mostly abruptly rounded to a sessile base and more glandular-toothed; seeds larger. — Canada to the mountains of N. C. (*fide* Haussknecht). (Asia.)

+ + *Mostly low, slender and simple* (*except forms of* n. 10); *leaves chiefly opposite, less toothed; flowers few, nodding; seeds appendaged at the apex.*

++ *Seeds areolate but not papillose; leaves not revolute.*

7. **E. anagallidifòlium,** Lam. Glabrate, a span high or less; leaves erect or ascending, about equalling the internodes, elliptical-oblong to narrowly obovate, entire or the upper denticulate, tapering to short petioles; flowers purple; sepals rather obtuse; capsules glabrous on peduncles exceeding the leaves. — White Mts. and Adirondacks (*fide* Haussknecht) (Eu.)

8. **E. lactiflòrum,** Haussk. Glabrous except the pubescent lines, 6 – 12′ high, with elongated internodes; leaves elliptical or the lowest round-obovate, slightly repand-denticulate, obtuse, tapering into mostly elongated petioles; flowers smaller, white; sepals more acute; seeds more prominently appendaged. — White Mts., and northward (*fide* Haussknecht). (Eu.)

++ ++ *Seeds papillose-roughened.*

9. **E. Hornemánni,** Reichenb. Glabrate, 8 – 18′ high; leaves mostly horizontal, ovate, the upper acutish, remotely denticulate, abruptly contracted

to winged petioles, not revolute; seeds often only slightly roughened, short and shortly appendaged. (E. alpinum, *Man.*) — White Mts., dells of the Wisconsin River (*Lapham*), and northward. (Eu.)

10. **E. palústre,** L. Slender, 1° high or less, often branched, finely pubescent; leaves erect or ascending, about equalling or longer than the internodes, sessile, linear to linear-lanceolate or elliptic-oblong, obtuse, with revolute margins; capsules pubescent to nearly glabrous, mostly shorter than the slender peduncles; seeds fusiform, with long beak. (E. palustre, var. lineare, *Man.*, in part.) — Penn. to Minn. and the White Mts., north and westward. (Eu.)

## 4. ŒNOTHÈRA, L. Evening Primrose.

Calyx-tube prolonged beyond the ovary, deciduous; the lobes 4, reflexed. Petals 4. Stamens 8; anthers mostly linear and versatile. Capsule 4-valved, many-seeded. Seeds naked. — Leaves alternate. Flowers yellow, white or rose-color. (An old name, of unknown meaning, for a species of Epilobium.)

§ 1. *Stigma-lobes linear, elongated (except in* n. 7*); calyx-tube linear, slightly dilated at the throat; anthers linear.*

* *Caulescent annuals or biennials; flowers erect in the bud, nocturnal, yellow, the calyx-tips free; capsules sessile, coriaceous; seeds in two rows in each cell.*

+- *Flowers in a leafy spike; capsules stout, oblong, slightly narrowed above.*

1. **Œ. biénnis,** L. (Common Evening Primrose.) Rather stout, erect (1 – 5° high), usually simple, more or less pubescent and hairy; leaves lanceolate to oblong- or rarely ovate-lanceolate (2 – 6′ long), acute or acuminate, repandly denticulate, the lowest petioled; calyx-tube 1 – 2½′ long, the tips of the sepals contiguous; petals ½ – ¾′ long; capsule more or less pubescent or hirsute. — Throughout the U. S. — Var. cruciàta, Torr. & Gray, with small narrow petals, appears to be merely a rare garden (?) sport. E. Mass.

Var. **grandiflòra,** Lindl., has petals as long as the calyx-tube (1 – 2½′ long). — Same range as the type, but not so common east.

2. **Œ. Oakesiàna,** Robbins. Annual, more slender, not hairy, the puberulence mainly appressed; calyx-tips not contiguous at base; otherwise nearly as in the typical form of the last. (Œ. biennis, var. Oakesiana, *Gray*.) — Dry places, E. Mass., R. I., and Conn.

+- +- *Flowers in a leafy spike or axillary; capsules linear.*

3. **Œ. rhombipétala,** Nutt. Rarely branching, appressed-puberulent and subcanescent; leaves narrowly lanceolate, acuminate, denticulate, the lowest attenuate to a petiole and rarely pinnatifid, diminishing upward into the close, elongated, conspicuously bracted spike; calyx silky-canescent (tube 1½′ long); petals rhombic-ovate (6 – 10′ long). — Ind. to Minn. and Ark.

4. **Œ. humifùsa,** Nutt. Stems decumbent or ascending (½ – 2° long); *hoary-pubescent with short dense appressed hairs; leaves* narrowly lanceolate or oblanceolate (¼ – 1′ long), *sparingly repand-dentate or entire,* the radical leaves pinnatifid, the floral not reduced; capsule ½ – 1′ long, silky, curved; seeds smooth. — On the sea-coast, N. J. to Fla.

5. **Œ. sinuàta,** L. Stems ascending or decumbent, simple or branched (1° high or more), *more or less strigose-pubescent* and puberulent; *leaves* oblong or lanceolate (1 – 2′ long), *sinuately toothed or often pinnatifid,* the floral simi-

lar; capsule 1 – 1½′ long; *seeds strongly pitted.* — N. J. to Fla., west to E. Kan. and Tex. Very variable.

* * *Caulescent perennial; flowers axillary, nodding in the bud, white turning rose-color; capsules sessile, linear; seeds in a single row.*

6. **Œ. albicaùlis,** Nutt. Stems erect (½ – 4° high), simple or branched, white and often shreddy, glabrous or puberulent; leaves linear to oblong-lanceolate (1 – 3′ long), entire or repand-denticulate, or sinuate-pinnatifid toward the base; calyx-tips free, throat naked; pods ½ – 2′ long, often curved or twisted; seeds lance-linear, smooth. — W. Minn. to N. Mex., and westward.

* * * *Caulescent; flowers diurnal, yellow and erect in the bud* (*except in* n. 11); *capsules obovate or clavate, quadrangular, the valves ribbed and the angles more or less strongly winged* (*except in* n. 7).

7. **Œ. linifòlia,** Nutt. Annual or biennial, erect, very slender, simple or diffuse (6 – 15′ high), glabrous, the branchlets and capsules puberulent; radical leaves oblanceolate, *cauline linear-filiform* ½ – 1′ long; spikes loosely flowered; corolla 2 – 3″ long; *stigmas short; capsules* obovate to oblong-clavate, 2 – 3″ long, *not winged,* nearly sessile. — Ill. to E. Kan., La., and Tex.

8. **Œ. pùmila,** L. Biennial, puberulent, 1 – 2° high; *leaves* mostly glabrous, *entire,* obtuse, the radical spatulate, the *cauline narrowly oblanceolate: flowers loosely spiked;* corolla 4 – 12″ long; *capsule glabrous,* oblong-clavate, 3 – 6″ long, sessile or on a short pedicel, *slightly winged.* (Incl. Œ. chrysantha, *Michx.*) — Dry fields, N. Scotia to N. J., west to Minn. and Kan. June.

9. **Œ. fruticòsa,** L. (Sundrops.) Biennial or perennial, erect, often tall and stout (1 – 3° high), villous-pubescent or puberulent or nearly glabrous; leaves oblong- to linear-lanceolate, *mostly denticulate; raceme corymbed or loose:* petals 9 – 12″ long; *capsule subsessile or with a pedicel shorter than itself,* prominently ribbed and *strongly winged.* — Common and very variable.

Var. **lineàris,** Watson. Leaves linear to linear-lanceolate; capsule usually shorter than the pedicel, rather less broadly winged. (Œ. linearis of *Man.,* in part. Œ. riparia, *Nutt.*) — Conn. to Fla., west to Mo. and La.

Var. **humifùsa,** Allen. Low, decumbent, somewhat woody, diffusely branched, puberulent; branches slender, flexuous; leaves narrow; flowers few, small; capsules pubescent, about equalling the pedicel. (Œ. linearis of *Man.,* in part.) — Suffolk Co., L. Island.

10. **Œ. glaùca,** Michx. Perennial, erect (2 – 3° high), *glabrous and glaucous; leaves ovate to ovate-oblong* (2 – 4′ long), repand-denticulate; *flowers in short leafy corymbs; petals* 9 – 15″ *long; capsule* glabrous, ovoid-oblong, *very broadly winged,* usually abruptly contracted into a pedicel equalling or shorter than itself. — Mountains of Va. to Ala., west to Ky. and E. Kan.

11. **Œ. speciòsa,** Nutt. Perennial, erect or subdecumbent, finely pubescent; leaves oblong-lanceolate to linear, repand-denticulate, or more or less deeply sinuate-pinnatifid; *flowers large, white or rose;* capsule clavate-obovate, strongly 8-ribbed, rigid, acute, stoutly pedicelled. — Mo. to Kan. and Tex.

* * * * *Capsule oblong to ovate or orbicular, broadly winged, rigid and sessile.*

+– *Acaulescent or nearly so; flowers white or rose-color.*

12. **Œ. trìloba,** Nutt. Biennial or perennial, nearly glabrous; leaves 2 – 10′ long, somewhat ciliate, long-petioled, runcinate-pinnatifid or oblanceo-

late and only sinuate-toothed; calyx-tips free, the tube slender (2 – 4′ long); petals 6 – 12″ long; capsule ovate, ½ – 1′ long, strongly winged, net-veined. — Ky. to Miss. and Tex., west to the Pacific.

Var. (?) **parviflòra,** Watson. Flowers very small (1 – 2′ long), fertilized in the bud and rarely fully opening; fruit abundant, forming at length a densely crowded hemispherical or cylindrical mass nearly 2′ in diameter and often 2 – 3′ high. — Plains of Kan. and Neb.

+ + *Low caulescent perennials; flowers axillary, yellow.*

13. **Œ. Missouriénsis,** Sims. Stems decumbent; pubescence short and silky, closely appressed, sometimes dense or wholly wanting; leaves thick, oval to linear, mostly narrowly lanceolate (2 – 5′ long), acuminate, entire or repand-denticulate; calyx-tube 2 – 5′ long; petals broad, 1 – 2½′ long; capsules orbicular, very broadly winged (1 – 3′ long). — Mo. and Kan. to Tex.

14. **Œ. Fremóntii,** Watson. Hoary with appressed silky pubescence; leaves linear, pointed, entire; calyx-tube 1 – 2′ long; petals ½ – 1′ long; capsule hoary, oblong, narrowed at base, 9″ long. — Central Kan.

§ 2. *Stigma discoid; calyx-tube more broadly dilated above; anthers oblong-linear; capsule mostly sessile, linear-cylindric; perennial, somewhat woody, with axillary yellow flowers.*

15. **Œ. Hartwègi,** Benth., var. **lavandulæfòlia,** Watson. Stems numerous from a woody base, 3 – 6′ high; *leaves numerous, hoary-puberulent,* mostly linear, ¼ – 1′ long; *calyx-tube* 1 – 2′ *long;* capsule 8 – 10″ long. — Central Kan. to Col. and N. Mex.

16. **Œ. serrulàta,** Nutt. Slender (3 – 15′ high), simple or branched, canescent or glabrous; leaves linear to lanceolate (1 – 3′ long), *irregularly and sharply denticulate; calyx-tube broadly funnelform* (2 – 4″ *long*), strongly nerved; petals broadly obovate (3 – 4″ long), crenulate; capsule 9 – 15″ long. — Wisc. and Minn. to Mo., Tex., and N. Mex.

## 5. GAÙRA, L.

Calyx-tube much prolonged beyond the ovary, deciduous; the lobes 4 (rarely 3), reflexed. Petals clawed, unequal or turned to the upper side. Stamens mostly 8, often turned down, as is also the long style. A small scale-like appendage before the base of each filament. Stigma 4-lobed, surrounded by a ring or cup-like border. Fruit hard and nut-like, 3 – 4-ribbed or angled, indehiscent or nearly so, usually becoming 1-celled and 1 – 4-seeded. Seeds naked. — Leaves alternate, sessile. Flowers rose-color or white, changing to reddish in fading, in spikes or racemes, in our species quite small (so that the name, from *γαῦρος, superb,* does not seem appropriate).

* *Fruit sessile or nearly so.*

1. **G. biénnis,** L. *Soft-hairy or downy* (3 – 8° high); *leaves oblong-lanceolate,* denticulate; *spikes wand-like; fruit oval or oblong,* acute at both ends, 2 – 3″ long, ribbed, downy. — Dry banks, N. Y. to Minn., and southward. Aug.

2. **G. parviflòra,** Dougl. Soft-villous and puberulent, 2 – 5° high; *leaves ovate-lanceolate,* repand-denticulate, *soft-pubescent; spikes dense; fruit oblong-clavate,* narrowed to both ends, 4-*nerved,* obtusely angled above, 3 – 4″ long. — Mo. to La. and westward.

3. **G. coccínea,** Nutt. *Canescent, puberulent or glabrate* (6 – 12′ high), very leafy; *leaves lanceolate, linear-oblong or linear*, repand-denticulate or entire; flowers in simple spikes, rose-color turning to scarlet; *fruit terete below, 4-sided and broader above*, 2 – 3″ long. — Minn. to Kan., and westward.

* * *Fruit slender-pedicelled.*

4. **G. fílipes,** Spach. Nearly smooth; stem slender (2 – 4° high); leaves linear, mostly toothed, tapering at base; branches of the panicle very slender, naked; fruit obovate-club-shaped, 4-angled at the summit. — Open places, Va. to Fla., west to Ill., Kan., and Ark.

## 6. STENÓSIPHON, Spach.

Calyx prolonged beyond the ovary into a filiform tube. Filaments (8) not appendaged at base. Fruit 1-celled, 1-seeded. Otherwise as Gaura, which it also resembles in habit. (From *στενός, narrow*, and *σίφων, a tube.*)

1. **S. virgàtus,** Spach. Slender, 2 – 4° high, glabrous, leafy, leaves narrowly lanceolate to linear, pointed, entire, much reduced above; flowers numerous in an elongated spike, white, ½′ long; fruit pubescent, oblong-ovate, 8-ribbed, small. — E. Kan. to Col. and Tex.

## 7. CIRCÆ̀A, Tourn. ENCHANTER'S NIGHTSHADE.

Calyx-tube slightly prolonged, the end filled by a cup-shaped disk, deciduous; lobes 2, reflexed. Petals 2, inversely heart-shaped. Stamens 2. Fruit indehiscent, small and bur-like, bristly with hooked hairs, 1 – 2-celled; cells 1-seeded. — Low and inconspicuous perennials, in cool or damp woods, with opposite thin leaves on slender petioles, and small whitish flowers in racemes, produced in summer. (Named from *Circe*, the enchantress.)

1. **C. Lutetiàna,** L. Taller (1 – 2° high); *leaves ovate*, slightly toothed; *bracts none;* hairs of the *roundish 2-celled fruit bristly.* — Very common. (Eu.)

2. **C. alpìna,** L. *Low* (3 – 8′ high), *smooth and weak; leaves heart-shaped, thin, shining, coarsely toothed; bracts minute;* hairs of the obovate-oblong *1-celled fruit* soft and slender. — Deep woods, N. Eng. to Ga., Ind., and Minn. (Eu.)

## ORDER 43. LOASÀCEÆ. (LOASA FAMILY.)

*Herbs, with a rough or stinging pubescence, no stipules, the calyx-tube adherent to a 1-celled ovary with 2 or 3 parietal placentæ;* — represented here only by the genus

## 1. MENTZÈLIA, Plumier.

Calyx-tube cylindrical or club-shaped; the limb 5-parted, persistent. Petals 5 or 10, regular, spreading, flat, convolute in the bud, deciduous. Stamens indefinite, rarely few, inserted with the petals on the throat of the calyx. Styles 3, more or less united into one; stigmas terminal, minute. Capsule at length dry and opening by valves or irregularly at the summit, few – many-seeded. Seeds flat, anatropous, with little albumen. — Stems erect. Leaves alternate, very adhesive by the barbed pubescence. Flowers terminal, solitary or cymose-clustered. (Dedicated to *C. Mentzel*, an early German botanist.)

* *Seeds few, oblong, not winged; petals 5, not large; filaments all filiform.*

1. **M. oligospérma,** Nutt. Rough and adhesive (1 – 3° high), much branched, the brittle branches spreading; leaves ovate and oblong, cut-toothed or angled, often petioled; flowers yellow (7 – 10″ broad), opening in sunshine; petals wedge-oblong, pointed; stamens 20 or more; capsule small, about 9-seeded. — Prairies and plains, Ill. to Kan. and Col., south to Tex.

* * *Seeds numerous, rounded and wing-margined; petals 10, large and showy; outer filaments petaloid in n. 3; capsule large, oblong; leaves sessile.*

2. **M. ornàta,** Torr. & Gray. Stout, 1 – 2° high; leaves oblong-lanceolate, deeply repand-toothed or pinnatifid, the segments acute; calyx-tube leafy-bracteate; petals 2 – 3′ long, yellowish-white; filaments all filiform or the outer dilated below; capsule 1½ – 2′ long; seeds narrowly margined. — On the plains, W. Dak. to central Kan. and Tex.

3. **M. nùda,** Torr. & Gray. More slender, 1 – 5° high; leaves somewhat lanceolate, rather bluntly or shortly repand-dentate; *flowers half as large as in the last; calyx not bracteate; outer filaments narrowly dilated,* sterile; *capsule about 1′ long; seeds plainly winged.* — Plains of Dak. to central Kan. and Tex.

## ORDER 44. PASSIFLORÀCEÆ. (PASSION-FLOWER FAMILY.)

*Herbs or woody plants, climbing by tendrils, with perfect flowers, 5 monadelphous stamens, and a stalked 1-celled ovary free from the calyx, with 3 or 4 parietal placentæ, and as many club-shaped styles.*

### 1. PASSIFLÒRA, L. PASSION-FLOWER.

Calyx of 5 sepals united at the base into a short cup, imbricated in the bud, usually colored like the petals, at least within; the throat crowned with a double or triple fringe. Petals 5, on the throat of the calyx. Stamens 5; filaments united in a tube which sheathes the long stalk of the ovary, separate above; anthers large, fixed by the middle. Berry (often edible) many-seeded; the anatropous albuminous seeds invested by a pulpy covering. Seed-coat brittle, grooved. — Leaves alternate, generally palmately lobed, with stipules. Peduncles axillary, jointed. Ours are perennial herbs. (An adaptation of *flos passionis,* a translation of *fior della passione,* the popular Italian name early applied to the flower from a fancied resemblance of its parts to the implements of the crucifixion.)

1. **P. lùtea,** L. Smooth, slender; *leaves obtusely 3-lobed at the summit, the lobes entire;* petioles glandless; flowers greenish-yellow (1′ broad); fruit ½′ in diameter. — Damp thickets, S. Penn. to Fla., west to Ill., Mo., and La.

2. **P. incarnàta,** L. Pubescent; *leaves 3 – 5-cleft, the lobes serrate,* the base bearing 2 glands; flower large (2′ broad), nearly white, with a triple purple and flesh-colored crown; involucre 3-leaved; fruit as large as a hen's egg. — Dry soil, Va. to Fla., west to Mo. and Ark. Fruit called *maypops.*

## ORDER 45. CUCURBITÀCEÆ. (GOURD FAMILY.)

*Mostly succulent herbs with tendrils, diœcious or monœcious (often gamopetalous) flowers, the calyx-tube cohering with the 1 - 3-celled ovary, and the*

*5 or usually 2½ stamens* (i. e., 1 with a 1-celled and 2 with 2-celled anthers) *commonly united by their often tortuous anthers, and sometimes also by the filaments. Fruit* (pepo) *fleshy, or sometimes membranaceous.* — Limb of the calyx and corolla usually more or less combined. Stigmas 2 or 3. Seeds large, usually flat, anatropous, with no albumen. Cotyledons leaf-like. Leaves alternate, palmately lobed or veined. — Mostly a tropical or subtropical order; represented in cultivation by the GOURD (LAGENÀRIA VULGÀRIS), PUMPKIN and SQUASH (species of CUCURBITA), MUSK-MELON (CÙCUMIS MÈLO), CUCUMBER (C. SATÌVUS), and WATERMELON (CITRÚLLUS VULGÀRIS).

* Fruit prickly. Seeds few, erect or pendulous. Flowers white. Annual.

+- Ovary 1-celled. Seed solitary, pendulous.

1. **Sicyos.** Corolla of the sterile flowers flat and spreading, 5-lobed. Fruit indehiscent.

+- +- Ovary 2–3-celled. Seeds few, erect or ascending.

2. **Echinocystis.** Corolla of the sterile flowers flat and spreading, 6-parted. Anthers 3. Fruit bladdery, 2-celled, 4-seeded, bursting at the top.
3. **Cyclanthera.** Corolla 5-parted. Anther 1, annular. Fruit oblique and gibbous.

* * Fruit smooth. Seeds numerous, horizontal, attached to the 3–5 parietal placentæ. Perennial.

4. **Melothria.** Flowers small, greenish; corolla 5-parted. Slender, climbing. Fruit small.
5. **Cucurbita.** Flowers large, yellow, tubular-campanulate. Prostrate. Fruit large.

### 1. SÍCYOS, L. ONE-SEEDED BUR-CUCUMBER.

Flowers monœcious. Petals 5, united below into a bell-shaped or flattish corolla. Anthers cohering in a mass. Ovary 1-celled, with a single suspended ovule; style slender; stigmas 3. Fruit ovate, dry and indehiscent, filled by the single seed, covered with barbed prickly bristles which are readily detached. — Climbing annuals, with 3-forked tendrils, and small whitish flowers; the sterile and fertile mostly from the same axils, the former corymbed, the latter in a capitate cluster, long-peduncled. (Greek name for the Cucumber.)

1. **S. angulàtus,** L. Leaves roundish heart-shaped, 5-angled or lobed, the lobes pointed; plant clammy-hairy. — River-banks, and a weed in damp yards, N. H. and Quebec to Fla., west to Minn., E. Kan., and Tex. July – Sept.

### 2. ECHINOCÝSTIS, Torr. & Gray. WILD BALSAM-APPLE.

Flowers monœcious. Petals 6, lanceolate, united at the base into an open spreading corolla. Anthers more or less united. Ovary 2-celled, with 2 erect ovules in each cell; stigma broad. Fruit fleshy, at length dry, clothed with weak prickles, bursting at the summit, 2-celled, 4-seeded, the inner part fibrous-netted. Seeds large, flat, with a thickish hard and roughened coat. — Tall climbing annual, nearly smooth, with 3-forked tendrils, thin leaves, and very numerous small greenish-white flowers; the sterile in compound racemes often 1° long, the fertile in small clusters or solitary, from the same axils. (Name composed of ἐχῖνος, *a hedgehog*, and κύστις, *a bladder*, from the prickly fruit.)

1. **E. lobàta,** Torr. & Gray. Leaves deeply and sharply 5-lobed; fruit oval (2′ long); seeds dark-colored. — Rich soil along rivers, W. New Eng and Penn. to Minn., E. Kan., and Tex. Also cult. for arbors. July – Oct.

### 3. CYCLANTHÈRA, Schrad.

Flowers monœcious. Corolla rotate, deeply 5-parted. Stamens united into a central column, the anther solitary in our species and annular. Ovary (1–3-) usually 2-celled and 4-locellate with 4 erect or ascending ovules. Fruit spiny, obliquely ovoid and gibbous, beaked, bursting irregularly. Seeds flattened. — Slender glabrous climbing annuals or perennials, with very small racemose or panicled white sterile flowers and a solitary fertile one in the same axil. (Name from *κύκλος, a circle,* and *ἀνθήρα, anther.*)

1. **C. dissécta,** Arn. Annual; leaves digitately 3–7-foliolate, the oblong divisions somewhat lobed or toothed; tendrils simple or bifid; fruit 1′ long, on a short peduncle. — Central Kan. to Tex. and Mex.

### 4. MELÒTHRIA, L.

Flowers polygamous or monœcious; the sterile campanulate, the corolla 5-lobed; the fertile with the calyx-tube constricted above the ovary, then campanulate. Anthers more or less united. Berry small, pulpy, filled with many flat and horizontal seeds. — Tendrils simple. Flowers very small. (Altered from *μήλωθρον*, an ancient name for a sort of white grape.)

1. **M. péndula,** L. Slender, from a perennial root, climbing; leaves small, roundish and heart-shaped, 5-angled or lobed, roughish; sterile flowers few in small racemes; the fertile solitary, greenish or yellowish; berry oval, green, 4–6″ long. — Copses, Va. to Fla., west to S. Ind. and La.

### 5. CUCÚRBITA, L.

Flowers monœcious, mostly solitary. Calyx-tube campanulate; corolla campanulate, 5-lobed to the middle. Filaments distinct; anthers linear, united, sigmoid. Ovary oblong, with short thick style, 3–5 2-lobed stigmas, and 3–5 parietal placentas; ovules numerous, horizontal. Fruit smooth, fleshy with a hard rind, indehiscent. — Prostrate scabrous vines, rooting at the joints, with large yellow flowers and large fruit. (The Latin name for the Gourd.)

1. **C. fœtidíssima,** HBK. Root very large, fusiform; leaves thick, triangular-cordate; flowers 3–4′ long; fruit globose or obovoid, 2–3′ in diameter. (C. perennis, *Gray.*) — Central Neb. to Tex., and westward.

## ORDER 46. CACTÀCEÆ. (CACTUS FAMILY.)

*Fleshy and thickened mostly leafless plants, of peculiar aspect, globular or columnar and many-angled, or flattened and jointed, usually with prickles. Flowers solitary, sessile; the sepals and petals numerous, imbricated* in several rows, the bases adherent to the 1-celled ovary. — Stamens numerous, with long and slender filaments, inserted on the inside of the tube or cup formed by the union of the sepals and petals. Style 1; stigmas numerous. Fruit a 1-celled berry, with numerous campylotropous seeds on several parietal placentæ.

1. **Mamillaria.** Globose or oval plants, covered with spine-bearing tubercles. Flowers from between the tubercles. Ovary naked; berry succulent.
2. **Opuntia.** Branching or jointed plants; the joints flattened or cylindrical.

### 1. MAMILLÀRIA. Haw.

Flowers about as long as wide, the tube campanulate or funnel-shaped. Ovary often hidden between the bases of the tubercles, naked, the succulent berry exserted. Seeds yellowish-brown to black, crustaceous. — Globose or oval plants, covered with spine-bearing cylindrical, oval, or conical tubercles, the flowers from distinct woolly or bristly areoles at their base. (Name from *mamilla*, a nipple, referring to the tubercles.)

1. **M. vivípara,** Haw. Simple or cespitose, 1 – 5′ high, the almost terete tubercles bearing bundles of 5 – 8 reddish-brown spines (10″ long or less), surrounded by 15 – 20 grayish ones in a single series, all straight and very rigid; flowers purple, with lance-subulate petals and fringed sepals; berry oval, green; seeds pitted, light brown. — Plains of Dak. to Kan., and westward.

2. **M. Missouriénsis,** Sweet. Smaller, globose, with fewer (10 – 20) weaker ash-colored spines; flowers yellow, 1 – 2′ broad; berry subglobose, scarlet; seeds few, black, pitted. (M. Nuttallii, *Engelm.*) — S. Dak. to central Kan., Tex., and westward.

### 2. OPÚNTIA, Tourn. PRICKLY PEAR. INDIAN FIG.

Sepals and petals not united into a prolonged tube, spreading, regular, the inner roundish. Berry often prickly. Seeds flat and margined, covered with a white bony arillus. Embryo coiled around albumen; cotyledons large, foliaceous in germination. — Stem composed of joints (flattened in ours), bearing very small awl-shaped and usually deciduous leaves arranged in a spiral order, with clusters of barbed bristles and often spines also in their axils. Flowers in our species yellow, opening in sunshine for more than one day. (A name of Theophrastus, originally belonging to some different plant.)

* *Spines small or none; fruit pulpy.*

1. **O. vulgàris,** Mill. Prostrate or spreading, *light green;* joints broadly obovate (2 – 4′ long); *leaves minute* (2 – 2½″ long), ovate-subulate, *generally appressed;* bristles short, greenish yellow, rarely with a few small spines; flowers pale yellow (*about* 2′ *broad*), *with about* 8 *petals;* fruit 1′ long. — Sandy fields and dry rocks, Nantucket to S. C., near the coast; Falls of the Potomac.

2. **O. Rafinésquii,** Engelm. Prostrate, *deep green;* joints broadly obovate or orbicular (3 – 5′ long); *leaves* (3 – 4″ long), *spreading;* bristles bright red-brown, with a few small spines and a single strong one (9 – 12″ long) or none; flowers yellow (2½ – 3½′ *broad*), *sometimes with a reddish centre; petals* 10 – 12; fruit 1½′ long, with an attenuated base. — Sterile soil, Nantucket and southward along the coast to Fla., and in the Mississippi valley, from Mich. to Minn., and south to Ky. and Ark.

* * *Very spiny, fruit dry and prickly.*

3. **O. Missouriénsis,** DC. Prostrate, *joints* light green, *broadly obovate, flat and tuberculate* (2 – 6′ long), leaves small (1½ – 2″ long); *their axils armed with a tuft of straw-colored bristles and* 5 - 10 *slender radiating spines* (1 – 2′ long); flowers light yellow (2 – 3′ broad); fruit with spines of variable length. — Wisc. to Mo., westward across the plains, very variable.

4. **O. frágilis,** Haw. Subdecumbent; *joints small* (1 – 2′ long or less), *ovate, compressed or tumid, or even terete;* leaves hardly 1″ long, red; *bristles*

*few, larger spines* 1 – 4, *cruciate, with* 4 – 6 *smaller white radiating ones below;* flowers yellow — Minn. to Iowa and Kan., and westward.

## ORDER 47. FICOÍDEÆ.

A miscellaneous group, *chiefly of fleshy or succulent plants, with mostly opposite leaves and no stipules.* Differing from Caryophyllaceæ and Portulacaceæ by having the ovary and capsule 2 – several-celled, and the stamens and petals sometimes numerous, as in Cactaceæ (but the latter wanting in most of the genera), seeds, as in all these orders, with the slender embryo curved about mealy albumen. Our genera are apetalous and with the calyx free from the ovary.

1 **Sesuvium.** Calyx-lobes 5, petaloid. Stamens 5 - 60. Capsule circumscissile. Succulent.
2. **Mollugo.** Sepals 5. Stamens 3 or 5. Capsule 3-valved. Not succulent.

### 1. SESÙVIUM, L. SEA PURSLANE.

Calyx 5-parted, purplish inside, persistent, free. Petals none. Stamens 5 – 60, inserted on the calyx. Styles 3 – 5, separate. Pod 3 – 5-celled, many-seeded, circumscissile, the upper part falling off as a lid. — Usually prostrate maritime herbs, with succulent stems, opposite leaves, and axillary or terminal flowers. (An unexplained name.)

1. **S. pentándrum,** Ell. Annual, procumbent or sometimes erect; leaves oblong- to obovate-spatulate, obtuse; flowers sessile; stamens 5. (S. Portulacastrum, *Gray*, Manual, not *L.*) — Sea-coast, N. J. to Fla.

### 2. MOLLÙGO, L. INDIAN-CHICKWEED.

Sepals 5, white inside. Stamens hypogynous, 5 and alternate with the sepals, or 3 and alternate with the 3 cells of the ovary. Stigmas 3. Capsule 3-celled, 3-valved, loculicidal, the partitions breaking away from the many-seeded axis. — Low homely annuals, much branched; the stipules obsolete. (An old Latin name for some soft plant.)

**M.** VERTICILLÀTA, L. (CARPET-WEED.) Prostrate, forming patches; leaves spatulate, clustered in whorls at the joints, where the 1-flowered pedicels form a sort of sessile umbel; stamens usually 3. — Sandy river-banks, and cultivated grounds. June – Sept. (An immigrant from farther south.)

## ORDER 48. UMBELLÍFERÆ. (PARSLEY FAMILY.)

*Herbs, with small flowers in umbels (or rarely in heads), the calyx entirely adhering to the 2-celled and 2-ovuled ovary, the 5 petals and 5 stamens inserted on the disk that crowns the ovary and surrounds the base of the 2 styles. Fruit consisting of 2 seed-like dry carpels.* Limb of the calyx obsolete, or a mere 5-toothed border. Petals either imbricated in the bud or valvate with the point inflexed. The two carpels (called *mericarps*) cohering by their inner face (the *commissure*), when ripe separating from each other and usually suspended from the summit of a slender prolongation of the axis (*carpophore*); each carpel marked lengthwise with 5 *primary ribs*, and often with 4 intermediate (*secondary*) ones; in the *inter-*

*stices* or *intervals* between them are commonly lodged the oil-tubes (*vittæ*), which are longitudinal canals in the substance of the fruit, containing aromatic oil. (These are best seen in slices made across the fruit.) Seed suspended from the summit of the cell, anatropous, with a minute embryo in hard albumen. — Stems usually hollow. Leaves alternate, mostly compound, the petioles expanded or sheathing at base; rarely with true stipules. Umbels usually compound, in which case the secondary ones are termed *umbellets:* the whorl of bracts which often subtends the general umbel is the *involucre*, and those of the umbellets the *involucels*. The base of the styles is frequently thickened and cushion-like, and called the *stylopodium*. In many the flowers are *dichogamous*, i. e. the styles are protruded from the bud some time before the anthers develop, — an arrangement for cross-fertilization. — A large family, some of the plants innocent and aromatic, others with very poisonous (acrid-narcotic) properties. The flowers are much alike in all, and the fruits, inflorescence, etc., likewise exhibit comparatively small diversity. The family is consequently difficult for the young student.

I. Fruit with the secondary ribs the most prominent, winged and armed with barbed or hooked prickles, the primary ribs filiform and bristly.

1. **Daucus.** Calyx-teeth obsolete. Fruit flattened dorsally. Seed-face flat.
2. **Caucalis.** Calyx-teeth prominent. Fruit flattened laterally. Seed-face deeply sulcate.

II. Fruit with primary ribs only (hence but 3 dorsal ones on each carpel).

* Fruit strongly flattened dorsally, with the lateral ribs prominently winged.

← Caulescent branching plants, with white flowers.

++ Lateral wings distinct; oil-tubes usually more than one in the intervals.

3. **Angelica.** Stylopodium mostly depressed, but the disk prominent and crenulate Dorsal ribs strong. Stout perennials, with mostly coarsely divided leaves.
4. **Conioselinum.** Stylopodium slightly conical. Dorsal ribs prominent. Tall slender glabrous perennial; leaves thin, finely pinnately compound.

++ ++ Lateral wings closely contiguous; oil-tubes solitary; stylopodium thick-conical.

5. **Tiedemannia.** Dorsal ribs apparently 5, filiform. Smooth swamp herbs with leaves few or reduced to hollow cylindrical petioles.
6. **Heracleum.** Dorsal ribs filiform, the broad wings with a marginal nerve. Oil-tubes obclavate. Petals conspicuous. Tall stout perennials, with large leaves.

← ← Caulescent branching plants, with depressed stylopodium and yellow flowers.

7. **Pastinaca.** Fruit with filiform dorsal ribs, thin wings, and solitary oil-tubes.
8. **Polytænia.** Fruit with a thick corky margin, obscure dorsal ribs, and very numerous oil-tubes.

← ← ← Acaulescent or nearly so, with filiform dorsal ribs, thin wings, and no stylopodium.

9. **Peucedanum.** Flowers white or yellow. Low western plants, of dry ground, with thick roots and finely dissected leaves.

* * Fruit not flattened either way or but slightly, neither prickly nor scaly.

← Ribs all conspicuously winged: stylopodium depressed or wanting

10. **Cymopterus.** Low and glabrous, mostly cespitose perennials, with pinnately compound leaves and white flowers. Oil-tubes 1 to several. Western.
11. **Thaspium.** Tall perennials, with ternately divided or simple leaves, and yellow flowers (rarely purple). Oil tubes solitary

+ + Ribs all prominent and equal but not winged; flowers white.

12. **Ligusticum.** Ribs acute, with broad intervals. Stylopodium conical. Oil-tubes numerous. Smooth perennials, with large compound leaves.
13. **Æthusa.** Ribs very broad and corky, acute. Stylopodium depressed. Oil-tubes solitary. Introduced annual.
14. **Cœlopleurum.** Ribs thick, corky (mostly obtuse). Oil-tubes solitary, adherent to the seed, which is loose in the pericarp. Stout glabrous sea-coast perennial.

+ + + Dorsal ribs filiform, the lateral very thick and corky; oil-tubes solitary.

15. **Crantzia.** Small glabrous creeping perennials, rooting in the mud, with small simple umbels and leaves reduced to hollow cylindrical jointed petioles.

* * * Fruit flattened laterally.

+ Carpels depressed dorsally; fruit short.

++ Seed-face flat; flowers mostly yellow.

16. **Fœniculum.** Ribs prominent. Oil-tubes solitary. Stout aromatic herb, with filiform-dissected leaves
17. **Pimpinella.** Ribs filiform. Oil-tubes numerous. Glabrous perennials, with compound leaves.

++ ++ Seed-face concave; flowers white (yellow in n. 20); ribs filiform or obsolete.

18. **Eulophus.** Oil-tubes numerous. Stylopodium conical. Glabrous perennials from fascicled tubers, with pinnately compound leaves.
19. **Anthriscus.** Fruit linear, long-beaked, without ribs or oil-tubes, and with conical stylopodium. Leaves ternately decompound.
20. **Bupleurum.** Fruit oblong, with slender ribs, no oil-tubes, and prominent flat stylopodium. Leaves simple, perfoliate.

+ + Carpels terete or slightly flattened laterally; flowers white (except n. 24).

++ Seed-face flat (or somewhat concave in n. 28); fruit short.

= Leaves 3-foliolate; stylopodium conical; oil-tubes solitary.

21. **Cryptotænia.** Ribs obtuse, equal; fruit linear-oblong.

= = Leaves once pinnate; stylopodium depressed; oil-tubes numerous. Aquatic perennials.

22. **Sium.** Fruit ovate to oblong ribs prominent, corky, nearly equal.
23. **Berula.** Fruit nearly globose; ribs inconspicuous; pericarp thick and corky.

= = = Leaves decompound. Oil-tubes solitary (none in n. 27). Perennials.

24. **Zizia.** Ribs filiform; stylopodium none. Flowers yellow.
25. **Carum.** Ribs filiform or inconspicuous; stylopodium short-conical. Leaf-segments filiform. Roots tuberous.
26. **Cicuta.** Ribs flattish, corky, the lateral largest. Marsh perennials, with serrate leaflets, the veins often running to the notches.
27. **Ægopodium.** Ribs filiform; oil-tubes none; stylopodium conical. Leaves biternate.

= = = = Leaves finely dissected; oil-tubes solitary. Very slender annuals.

28. **Leptocaulis.** Fruit bristly or tuberculate, with rather prominent equal ribs.
29. **Discopleura.** Dorsal ribs filiform, the lateral very thick and corky.

++ ++ Seed-face concave; fruit ovate, glabrous, with depressed stylopodium, and no oil-tubes.

30. **Conium.** An introduced biennial, with spotted stems, and large decompound leaves.

++ ++ ++ Seed-face concave. Fruit linear-oblong, with conical stylopodium.

31. **Chærophyllum.** Fruit glabrous, with small mostly solitary oil-tubes.
32. **Osmorrhiza.** Fruit bristly, with oil-tubes obsolete.

+ + + Carpels (as well as fruit) strongly flattened laterally.

++ Seed lunate, deeply sulcate on the face; umbels compound, leafy-bracted.

33. **Erigenia.** Fruit nearly orbicular, with numerous oil-tubes. Low, nearly acaulescent. from a deep-seated tuber. Leaves ternately decompound.

++ ++ Seed straight, not sulcate; umbels simple.

34. **Hydrocotyle.** Fruit more or less orbicular, with no oil tubes. Low perennials, in or near water, with creeping stems, and peltate or reniform leaves.

* * * * Fruit obovoid or globose, densely prickly or scaly.

35. **Eryngium.** Flowers sessile in dense bracteate heads, white or blue. Leaves mostly rigid and more or less spinose.

36. **Sanicula.** Flowers in irregularly compound few-rayed umbels, yellow. Leaves palmate.

## 1. DAÙCUS, Tourn. CARROT.

Calyx-teeth obsolete. Fruit oblong, flattened dorsally; stylopodium depressed; carpel with 5 slender bristly primary ribs and 4 winged secondary ones, each of the latter bearing a single row of barbed prickles; oil-tubes solitary under the secondary ribs, two on the commissural side; seed-face somewhat concave or almost flat. — Bristly annuals or biennials, with pinnately decompound leaves, foliaceous and cleft involucral bracts, and white flowers in compound umbels which become strongly concave. (The ancient Greek name.)

**D.** CARÒTA, L. Biennial; stem bristly; ultimate leaf-segments lanceolate and cuspidate; rays numerous. — Naturalized everywhere, from Eu.

## 2. CAUCÀLIS, L.

Calyx-teeth prominent. Fruit ovate or oblong, flattened laterally; stylopodium conical; prickles barbed or hooked; seed-face deeply sulcate. Otherwise as Daucus. — Our species annual. (The ancient Greek name.)

**C.** NODÒSA, Hudson. Decumbent, branching only at base, stems 1 – 2° long, retrorsely hispid; umbels naked, opposite the leaves and nearly sessile, of 2 or 3 very short rays. — Md., Iowa, and southward. (Nat. from Eu.)

**C.** ANTHRÍSCUS, Hudson, has 1 – 2-pinnate leaves with broad leaflets, and more regularly compounded umbels. — Ohio, etc. (Nat. from Eu.)

## 3. ANGÉLICA, L.

Calyx-teeth obsolete. Fruit strongly flattened dorsally; primary ribs very prominent, the laterals extended into broad distinct wings, forming a double-winged margin to the fruit; oil-tubes one to several in the intervals or indefinite, 2 to 10 on the commissure. — Stout perennials, with ternately or pinnately compound leaves, large terminal umbels, scanty or no involucres, small many-leaved involucels, and white or greenish flowers. (Named *angelic* from its cordial and medicinal properties.)

* *Seed adherent to the pericarp; oil-tubes one to several in the intervals; uppermost leaves mostly reduced to large inflated petioles.*

1. **A. Curtísii,** Buckley. Glabrous; leaves twice ternate or the divisions quinate; *leaflets thin,* ovate-lanceolate (1 – 3′ *broad*), *sharply and irregularly toothed; fruit glabrous,* 1½ – 3″ broad; oil-tubes mostly one in the intervals (sometimes 2 or 3). — Along the Alleghanies from Penn. to N. C. Aug.

2. **A. hirsùta,** Muhl. *Pubescent above;* leaves twice pinnately or ternately divided; *leaflets thickish,* lanceolate to oblong (5 – 10″ *broad*), *serrate; fruit pubescent,* 2″ broad; oil-tubes 3 – 6 in the intervals. (Archangelica hirsuta, *Torr. & Gray.*) — Dry ground, Conn. to Minn., Tenn., and Fla. July.

* * *Seed loose; oil-tubes indefinite* (25 – 30); *upper petioles not so prominent.*

3. **A. atropurpùrea,** L. Very stout, glabrous throughout, with dark purple stem; leaves 2 – 3-ternately divided, the pinnate segments of 5 – 7 lan-

ceolate to ovate leaflets (1 – 1½′ broad), sharply mucronate-serrate. (Archangelica atropurpurea, *Hoffm.*) — River-banks, Lab. to Del., Ill. and Minn. June.

### 4. CONIOSELÌNUM, Fisch. Hemlock-Parsley.

Calyx-teeth obsolete. Stylopodium slightly conical. Fruit oval, flattened dorsally, glabrous, the dorsal ribs very prominent, the lateral ones extended into broad wings; oil-tubes 1 – 4 in the intervals, 4 – 8 on the commissure; seed slightly concave on the inner face. — Tall slender glabrous perennial, with finely 2 – 3-pinnately compound leaves, few-leaved involucre or none, involucels of elongated linear-setaceous bractlets, and white flowers. (Compounded of *Conium* and *Selinum*, from its resemblance to these genera.)

1. **C. Canadénse,** Torr. & Gray. Leaflets pinnatifid; wings nearly as broad as the seed; oil-tubes 2 – 3 in the intervals, sometimes 1 or 4. — Swamps and cold cliffs, from Maine to Minn., southward to N. C. (in the higher mountains), Ind., Ill., and Mo. Aug. – Oct.

### 5. TIEDEMÁNNIA, DC.

Calyx-teeth evident. Fruit ovate to obovate, flattened dorsally; dorsal ribs filiform, the lateral broadly winged, closely contiguous and strongly nerved next to the body (giving the appearance of 5 dorsal ribs); oil-tubes solitary in the intervals, 2 – 6 on the commissure; stylopodium short, thick-conical. — Glabrous erect aquatic herbs, with leaves reduced to petioles or of few narrow leaflets; involucre and involucels present, and flowers white. (Dedicated to the anatomist *Prof. Tiedemann*, of Heidelberg.)

1. **T. teretifòlia,** DC. Stem hollow, 2 – 6° high; *leaves reduced to cylindrical hollow pointed nodose petioles;* oil-tubes filling the intervals. — Ponds and swamps, Del. to Fla., and west to La. Aug., Sept.

2. **T. rígida,** Coult. & Rose. (Cowbane.) Stem 2 – 5° high; *leaves simply pinnate,* with 3 – 9 linear to lanceolate entire or remotely toothed leaflets; oil-tubes mostly small. (Archemora rigida, *DC.*) — Swamps, N. Y. to Minn., south to the Gulf. Aug. Poisonous; roots tuberiferous.

### 6. HERACLÈUM, L. Cow-Parsnip.

Calyx-teeth minute. Fruit broadly oval or obovate, like Pastinaca, but with a thick conical stylopodium, and the conspicuous obclavate oil-tubes extending scarcely below the middle. — Tall stout perennial, with large ternately compound leaves, broad umbels, deciduous involucre, and many-leaved involucels, white flowers, and obcordate petals, the outer ones commonly larger and 2-cleft. (Dedicated to *Hercules.*)

1. **H. lanàtum,** Michx. Woolly; stem grooved, 4 – 8° high; leaflets broad, irregularly cut-toothed. — Wet ground, Newf. to the Pacific, and southward to N. C., Ky., and Kan. June.

### 7. PASTINÀCA, L. Parsnip.

Calyx-teeth obsolete. Fruit oval, very much flattened dorsally; dorsal ribs filiform, the lateral extended into broad wings, which are strongly nerved toward the outer margin; oil-tubes small, solitary in the intervals, 2 – 4 on the commissure; stylopodium depressed. — Tall stout glabrous biennial, with pinnately compound leaves, mostly no involucre or involucels, and yellow flowers. (The Latin name, from *pastus*, food.)

**P.** SATÌVA, L. Stem grooved; leaflets ovate to oblong, cut-toothed. — Introduced everywhere. (Adv. from Eu.)

### 8. POLYTÆNIA, DC.

Calyx-teeth conspicuous. Fruit obovate to oval, much flattened dorsally; dorsal ribs small or obscure in the depressed back, the lateral with broad thick corky closely contiguous wings forming the margin of the fruit; oil-tubes 12 – 18 about the seed and many scattered through the thick corky pericarp. — A perennial mostly glabrous herb, with 2-pinnate leaves (upper opposite and 3-cleft), the segments cuneate and incised, no involucre, narrow involucels, and bright yellow flowers in May. (Named from *πολύς*, *many*, and *ταινία*, *a fillet*, alluding to the numerous oil-tubes.)

1. **P. Nuttàllii,** DC. Plant 2 – 3° high; pedicels and involucels pubescent. — Barrens, Mich. to N. Ala., west to the Rocky Mts.

### 9. PEUCÉDANUM, L.

Calyx-teeth mostly obsolete. Fruit roundish to oblong, much flattened dorsally; dorsal ribs filiform and approximate; the lateral extended into broad closely coherent wings; oil-tubes 1 – 4 in the intervals, 2 – 6 on the commissure. — Dry ground acaulescent (or short caulescent) herbs, with fusiform roots, dissected leaves, no involucre, yellow or white flowers, and stylopodium depressed or wanting. (The ancient Greek name.)

1. **P. nudicaùle,** Nutt. Pubescent, with peduncles 3 – 8′ high; *leaves bipinnate, the small oblong segments entire or toothed; involucels of scarious-margined (often purplish) lanceolate bractlets; flowers white or pinkish; fruit almost round,* emarginate at base, *glabrous,* with wings hardly as broad as the body, and *indistinct or obsolete dorsal ribs; oil-tubes solitary in the intervals.* — Minn. to Iowa and Kan., and westward. One of the earliest spring bloomers.

2. **P. fœniculàceum,** Nutt. Tomentose or glabrous, with peduncles 8 – 12′ long; *leaves finely dissected, with short filiform segments; involucels gamophyllous, 5 – 7-cleft, with conspicuously hairy margins; flowers yellow; fruit broadly oblong, glabrous,* with wings half as broad as the body, and *prominent dorsal ribs; oil-tubes* 1 – 3 *in the intervals.* — Minn. to Tex. March – April.

3. **P. villòsum,** Nutt. More or less pubescent throughout, 3 – 8′ high; *leaves finely dissected, with very numerous narrow crowded segments; involucels of ovate to linear bractlets; flowers yellow; fruit oval,* with wings half as broad as the body, and *prominent dorsal ribs; oil-tubes* 3 *or* 4 *in the intervals.* — Minn. to Neb. and Dak., southwestward to Ariz. Root much elongated.

### 10. CYMÓPTERUS, Raf.

Calyx-teeth more or less prominent. Fruit usually globose, with all the ribs conspicuously winged; oil-tubes one to several in the intervals, 2 – 8 on the commissure. Stylopodium depressed. Seed-face slightly concave. — Mostly low (often cespitose) glabrous perennials, from a thick elongated root, with more or less pinnately compound leaves, with or without an involucre, prominent involucels, and white flowers (in ours). (From *κῦμα*, *a wave*, and *πτερόν*, *a wing*, referring to the often undulate wings.)

1. **C. glomeràtus,** Raf. Low (3 – 8′), with a short erect caudex bearing leaves and peduncles at the summit, glabrous; rays and pedicels very short, *making a compact cluster; involucre none; involucel of a single palmately* 5 – 7-*parted bractlet;* fruit globose (3 – 4″ in diam.); wings rather corky; *oil-tubes* 4 *or* 5 *in the intervals.* — Minn. and Wisc. to Iowa and Ark., and westward.

2. **C. montànus,** Torr. & Gray. Of similar habit (1 – 6′ high), glaucous and mostly glabrous; *rays* 3 – 9″ *long,* pedicels very short; *involucre and involucels of mostly broad membranaceous usually green-veined bracts* (more or less united); fruit oblong to orbicular in outline (3 – 6″ long); wings thin; *oil-tubes* 1 – 3 *in the intervals.* — Neb. to central Kan., Tex., and westward. April.

## 11. THÁSPIUM, Nutt. MEADOW-PARSNIP.

Calyx-teeth conspicuous. Fruit ovoid to oblong, slightly flattened dorsally; carpel with 3 or 4 or all the ribs strongly winged; oil-tubes solitary in the intervals, 2 on the commissure. Stylopodium wanting; styles long. — Perennials (2 – 5° high), with ternately divided leaves (or the lower simple) and broad serrate or toothed leaflets, mostly yellow flowers, and all the fruit pedicelled. (Name a play upon *Thapsia,* so called from the island of Thapsus.)

1. **T. aùreum,** Nutt. *Glabrous; root-leaves mostly cordate, serrate; stem-leaves simply ternate* (rarely biternate); leaflets ovate to lanceolate, round or tapering at base, serrate; *flowers deep yellow;* fruit globose-ovoid, about 2″ long, *all the ribs equally winged.* — Thickets and woodlands, throughout the Atlantic States and west into the Miss. Valley. Fl. in summer and maturing fruit in late summer or autumn. Very variable, an extreme form being

Var. **trifoliàtum,** Coult. & Rose. Leaves or leaflets crenate or crenately toothed. (T. trifoliatum, *Gray,* Man., in part.) — Ohio to Ill., westward to Oregon. The common western form.

Var. **atropurpùreum,** Coult. & Rose. Petals dark-purple. (T. trifoliatum, var. atropurpureum, *Gray,* Man.) — Same range as the species.

2. **T. barbinòde,** Nutt. Loosely branched, *pubescent on the joints,* sometimes puberulent in the umbels; *leaves* 1 – 3-*ternate; leaflets ovate to lanceolate,* acute, with cuneate base, coarsely cut-serrate, often ternately cleft or parted; *flowers light yellow;* fruit broadly oblong, about 3″ long and 2″ broad, *with mostly* 7 *prominent wings.* — Banks of streams, N. Y. to Minn., and southward. May – June. — Var. ANGUSTIFÒLIUM, Coult. & Rose, has narrower, more sharply cut leaflets, and fruit more or less puberulent. — Penn. to Ill.

3. **T. pinnatífidum,** Gray. Resembling the last, but *puberulent on the branchlets, umbels, and fruit, with fewer leaves; leaflets* 1 – 2-*pinnatifid,* the lobes linear or oblong; one or two leaves near the base often very large and long-petioled; flowers light yellow; fruit oblong, 1½ – 2½″ long and 1 – 1½″ broad, *all the ribs winged,* generally three of them narrowly so. (T. Walteri, *Shuttlew.* in herb.) — Barrens and mountains, Ky. to Tenn. and N. C.

## 12. LIGÚSTICUM, L. LOVAGE.

Calyx-teeth obsolete. Fruit oblong or ovate, flattened laterally if at all, glabrous; carpels with prominent equal acute ribs and broad intervals; oil-tubes 2 – 6 in the intervals, 6 – 10 on the commissure. Stylopodium conical. — Smooth perennials, from large aromatic roots, with large ternately compound leaves, mostly no involucre, involucels of narrow bractlets, and white flowers in large many-rayed umbels. (Named from the country *Liguria*, where the officinal *Lovage* of the gardens abounds.)

1. **L. actæifòlium,** Michx. (Nondo. Angelico.) Stem stout, branched above (2–6° high); *leaves very large,* 3–4-*ternate; leaflets broadly oblong* (2–5′ *long*), *coarsely serrate; fruit ovate* (2–3″ *long*); seed with angled back. — Rich ground, S. Penn. to Ky., southward to the Gulf.

2. **L. Scóticum,** L. (Scotch Lovage.) Stem simple (1–2° high); *leaves biternate; leaflets ovate* (1–2′ *long*), *coarsely toothed; fruit narrowly oblong* (4–5″ *long*); seed with round back. — Salt marshes, along the coast from E. Conn. northward. Aug. (Eu.)

## 13. ÆTHÙSA, L. Fool's Parsley.

Calyx-teeth obsolete. Fruit ovate-globose, slightly flattened dorsally; carpel with 5 thick sharp ribs; oil-tubes solitary in the intervals, 2 on the commissure. — Poisonous annuals, with 2–3-ternately compound leaves, divisions pinnate, ultimate segments small and many cleft, no involucre, long narrow involucels, and white flowers. (Name from *αἴθω, to burn,* from the acrid taste.)

**Æ.** Cynàpium, L. A fetid, poisonous European herb, in cultivated grounds, from N. Eng. and Penn. to Minn. June–Aug.

## 14. CŒLOPLEÙRUM, Ledeb.

Calyx-teeth obsolete. Fruit globose to oblong, with very prominent nearly equal thick corky ribs (none of them winged); oil-tubes solitary in the intervals and under the ribs, 2 on the commissure. Seed loose in the pericarp. — Stout glabrous (or inflorescence puberulent) sea-coast perennial, with 2–3-ternate leaves on very large inflated petioles, few-leaved deciduous involucre, involucels of numerous small linear-lanceolate bractlets (rarely conspicuous or even leaf-like), and greenish-white flowers in many-rayed umbels. (From *κοῖλος, hollow,* and *πλευρόν, a rib.*)

1. **C. Gmélini,** Ledeb. Stem 1–3° high; leaflets ovate, irregularly cut-serrate (2–2½′ long); fruit 2–3½″ long. (Archangelica Gmelini, *DC.*) — Rocky coasts, Mass. to Greenland.

## 15. CRÁNTZIA, Nutt.

Calyx-teeth small. Fruit globose or slightly flattened laterally; dorsal ribs filiform, the lateral thick and corky; oil-tubes solitary in the intervals, 2 on the commissure. — Small perennials, creeping and rooting in the mud, with hollow cylindrical or awl-shaped nodose petioles in place of leaves, simple few-flowered umbels, and white flowers. (Named for *Prof. Henry John Crantz,* an Austrian botanist of the 18th century.)

1. **C. lineàta,** Nutt. Leaves very obtuse, 1–3′ long, 1–2″ broad; fruit 1″ long, the thick lateral wings forming a corky margin. — In brackish marshes along the coast, from Mass. to Miss. July. Very widely distributed.

## 16. FŒNÍCULUM, Adans. Fennel.

Calyx-teeth obsolete. Fruit oblong, glabrous, with prominent ribs and solitary oil-tubes. — Stout glabrous aromatic herb, with leaves dissected into numerous filiform segments, no involucre nor involucels, and large umbels of yellow flowers. (The Latin name, from *fœnum*, hay.)

**F.** OFFICINÀLE, All., the cultivated fennel from Europe, has become naturalized along the shores of Md. and Va., and is a common escape.

## 17. PIMPINÉLLA, L.

Calyx-teeth obsolete. Fruit oblong to ovate, glabrous, with slender equal ribs, numerous oil-tubes, and depressed or cushion-like stylopodium. — Glabrous perennials, with ternately or pinnately compound leaves, involucre and involucels scanty or none, and white or yellow flowers. (Name said to be formed from *bipinnula*, referring to the bipinnate leaves.)

1. **P. integérrima,** Benth. & Hook. Glaucous, 1–3° high, slender, branching; leaves 2–3-ternate, with lanceolate to ovate entire leaflets; flowers yellow; fruit broadly oblong, 2″ long; stylopodium small or wanting. (Zizia integerrima, *DC.*) — Rocky hillsides, Atlantic States to Minn., E. Kan., and Ark. May.

**P.** SAXÍFRAGA, L., var. MÀJOR, Koch. Leaves simply pinnate, with sharply toothed leaflets; flowers white; fruit oblong, 1″ long; stylopodium cushion-like. — Rocky shores of Delaware River; Sycamore, Ohio. (Nat. from Eu.)

## 18. EÙLOPHUS, Nutt.

Calyx-teeth prominent. Fruit ovate or oblong, glabrous, with equal filiform ribs; oil-tubes 1–5 in the intervals; stylopodium conical, with long recurved styles; seed-face broadly concave, with a central longitudinal ridge. — Glabrous perennials (3–5° high) from deep-seated fascicled tubers, with pinnately or ternately compound leaves, involucels of numerous narrowly lanceolate acuminate bractlets, and long-peduncled umbels of white flowers. (Name from εὖ, *well*, and λόφος, *a crest*, — not well applied to a plant with no crest at all.)

1. **E. Americànus,** Nutt. Radical and lower stem-leaves large, 1–2-pinnately compound, with leaflets cut into short narrow segments; upper stem-leaves ternate, with narrowly linear elongated leaflets; fruit 2–3″ long. — Ohio to Ill. and Mo., south to Tenn. and Ark. July.

## 19. ANTHRÍSCUS, Hoffm. CHERVIL.

Calyx-teeth obsolete. Fruit linear, notched at base, long-beaked, glabrous, without ribs (but beak ribbed); oil-tubes none, stylopodium conical; seed-face sulcate. — Resembling *Chærophyllum* in vegetative characters. (The ancient Roman name.)

**A.** CEREFÒLIUM, Hoffm. Mature fruit smooth and shining. (Chærophyllum sativum, *L.*) — Naturalized in E. Penn. (From Eu.)

## 20. BUPLEÙRUM, L. THOROUGH-WAX.

Calyx-teeth obsolete. Fruit oblong, with very slender ribs, no oil-tubes, depressed stylopodium, and seed-face somewhat concave. — Smooth annual, with ovate perfoliate entire leaves, no involucre, involucels of 5 very conspicuous ovate mucronate bractlets, and yellow flowers. (Name from βοῦς, *an ox*, and πλευρόν, *a rib*.)

**B.** ROTUNDIFÒLIUM, L., is very common in fields and cultivated ground, N. Y. to N. C., west to Mo. and Ark. (Nat. from Eu.)

### 21. CRYPTOTÆNIA, DC. HONEWORT.

Calyx-teeth obsolete. Fruit linear-oblong, glabrous, with obtuse equal ribs; oil-tubes solitary in the intervals and beneath each rib; stylopodium slender-conical; seed-face plane. — A glabrous perennial, with thin 3-foliolate leaves, no involucre, involucels of minute bractlets or none, and white flowers. (Name from κρυπτός, *hidden*, and ταινία, *a fillet*, referring to the concealed oil-tubes.)

1. **C. Canadénsis**, DC. Plant 1 – 3° high; leaflets large, ovate (2 – 4′ long), pointed, doubly serrate, often lobed; umbels irregular and unequally few-rayed; pedicels very unequal; fruit 2 – 3″ long, often becoming curved. — N. Brunswick to Ga., west to Minn., E. Kan., and Tex. June – Sept.

### 22. SÌUM, Tourn. WATER PARSNIP.

Calyx-teeth minute. Fruit ovate to oblong, glabrous, with prominent corky nearly equal ribs; oil-tubes 1 – 3 in the intervals; stylopodium depressed; seed-face plane. — Smooth perennials, growing in water or wet places, with pinnate leaves and serrate or pinnatifid leaflets, involucre and involucels of numerous narrow bracts, and white flowers. (From σίον, the Greek name of some marsh plant.)

1. **S. cicutæfòlium**, Gmelin. *Stout*, 2 – 6° high; *leaflets* 3 – 8 *pairs*, linear to lanceolate, sharply serrate and mostly acuminate, 2 – 5′ *long* (lower leaves sometimes submersed and finely dissected, as in the next); *fruit* 1½″ *long*, with prominent ribs. (S. lineare, *Michx.*) — Throughout N. America.

2. **S. Carsònii**, Durand. *Weak*, 1 – 2° high; *leaflets* 1 – 3 *pairs*, linear, sharply serrate, 1 – 2′ *long; when submersed or floating, very thin, ovate to oblong, usually laciniately toothed or dissected*, the leaf sometimes reduced to the terminal leaflet; *fruit about* 1″ *long.* — Mass., R. I., Conn., and Penn.

### 23. BÉRULA, Koch.

Calyx-teeth minute. Fruit nearly round, emarginate at base, glabrous; carpels nearly globose, with very slender inconspicuous ribs and thick corky pericarp; oil-tubes numerous and contiguous about the seed-cavity; seed terete. — Smooth aquatic perennial, with simply pinnate leaves and variously cut leaflets, usually conspicuous involucre and involucels of narrow bracts, and white flowers. (The Latin name of the Water-cress, of Celtic origin.)

1. **B. angustifòlia**, Koch. Erect, ½ – 3° high; leaflets 5 – 9 pairs, linear to oblong or ovate, serrate to cut-toothed, often laciniately lobed, sometimes crenate (½ – 3′ long); fruit scarcely 1″ long. (Sium angustifolium, *L.*) — Throughout the U. S. July, Aug.

### 24. ZÍZIA, Koch.

Calyx-teeth prominent. Fruit ovate to oblong, glabrous, with filiform ribs; oil-tubes large and solitary in the broad intervals, and a small one in each rib; stylopodium wanting; seed terete. — Smooth perennials (1 – 3° high), with mostly Thaspium-like leaves, no involucre, involucels of small bractlets, yellow flowers, and the central fruit of each umbellet sessile. Flowering in early spring in open prairies and upland meadows. (Named for *I. B. Ziz*, a Rhenish botanist.)

1. **Z. aùrea,** Koch. *Leaves* (except the uppermost) 2 – 3-*ternate*, the radical very long-petioled; leaflets ovate to lanceolate, sharply serrate; rays 15 – 25, stout (1 – 2′ long); *fruit oblong, about 2″ long.* (Thaspium aureum, var. apterum, *Gray*, Manual.) — Atlantic States, west to Minn. and Tex.

Var. **Bébbii,** Coult. & Rose. A more slender mountain form, with leaflets more coarsely serrate, the radical leaves smaller and more simple; rays 2 – 8, slender (2 – 3′ long); fruit oval, 1 – 1½″ long. — W. Va. and Va. to Ga.

2. **Z. cordàta,** DC. Radical leaves mostly long-petioled, *cordate or even rounder, crenately toothed*, very rarely lobed or divided; *stem-leaves simply ternate or quinate*, with the ovate or lanceolate leaflets serrate, incised, or sometimes parted; *fruit ovate*, 1½″ *long.* (Thaspium trifoliatum, var. apterum, *Gray*, Manual.) — Same range as the preceding, but extending farther westward.

### 25. CÀRUM, L. CARAWAY.

Calyx-teeth small. Fruit ovate or oblong, glabrous, with filiform or inconspicuous ribs; oil-tubes solitary; stylopodium conical; seed-face plane or nearly so. — Smooth erect slender herbs, with fusiform or tuberous roots, pinnate leaves, involucre and involucels of few to many bracts, and white (or yellowish) flowers. (Name perhaps from the country, *Caria.*)

C. CÁRUI, L. (CARAWAY.) Leaves pinnately compound, with filiform divisions. — Naturalized in many places, especially northward. (Nat. from Eu.)

C. PETROSELÌNUM, Benth., the common PARSLEY, from Europe, with 3-pinnate leaves, ovate 3-cleft leaflets, and greenish yellow flowers, is occasionally found as an escape from cultivation. (Petroselinum sativum, *Hoffm.*)

### 26. CICÙTA, L. WATER-HEMLOCK.

Calyx-teeth prominent. Fruit oblong to nearly orbicular, glabrous, with strong flattish corky ribs (the lateral largest); oil-tubes conspicuous, solitary; stylopodium depressed; seed nearly terete. — Smooth marsh perennials, very poisonous, with pinnately compound leaves and serrate leaflets, involucre usually none, involucels of several slender bractlets, and white flowers. (The ancient Latin name of the Hemlock.)

1. **C. maculàta,** L. (SPOTTED COWBANE MUSQUASH ROOT. BEAVER-POISON.) Stem *stout*, 2 – 6° high, streaked with purple; leaves 2 – 3-pinnate, the lower on long petioles; *leaflets lanceolate* to oblong-lanceolate (1 – 5′ long), acuminate, coarsely serrate, the veins passing to the notches; pedicels in the umbellets numerous, very unequal; fruit broadly ovate to oval, 1 – 1½″ long. — Throughout the U. S. Aug.

2. **C. bulbífera,** L. *Rather slender*, 1 – 3° high; leaves 2 – 3-pinnate (sometimes appearing ternate); *leaflets linear*, sparsely toothed (1 – 2′ long); *upper axils bearing clustered bulblets;* fruit (rare) scarcely 1″ long. — Common in swamps, N. Scotia to Del., west to Minn. and Iowa.

### 27. ÆGOPÒDIUM, L. GOUTWEED.

Calyx-teeth obsolete. Fruit ovate, glabrous, with equal filiform ribs, and no oil-tubes; stylopodium conical and prominent; seed nearly terete. — A coarse glabrous perennial, with creeping rootstock, biternate leaves, sharply toothed ovate leaflets, and rather large naked umbels of white flowers. (Name from αἴξ, *goat,* and πόδιον, *a little foot,* probably from the shape of the leaflets.)

Æ. PODAGRÀRIA, L., a common and troublesome weed in Europe, is reported from R. I. to Del. and E. Penn.

### 28. LEPTOCAÙLIS, Nutt.

Calyx-teeth obsolete. Fruit very small, ovate, usually bristly or tuberculate, with somewhat prominent ribs; oil-tubes solitary in the intervals; stylopodium conical; seed-face plane or somewhat concave. — Very slender smooth branching annuals, with finely dissected leaves (segments filiform or linear), and small white flowers in very unequally few-rayed pedunculate umbels (Name from *λεπτός, slender*, and *καυλός, a stem.*)

1. **L. divaricàtus,** DC. Plant 1 – 2° high, with branches and umbels diffusely spreading, the very slender rays ½ – 1′ long and the longer pedicels often 3 – 6″ long; fruit tuberculate, ½″ long. (Apium divaricatum, *Benth. & Hook.*) — N. C. to Fla., west to Ark. and Tex.; reported from Kan. April.

2. **L. pàtens,** Nutt. Of similar habit, but the umbels shorter and more strict, the rays 3 – 6″ long or less and the pedicels short; fruit densely sharp-tuberculate or nearly smooth. (Apiastrum patens, *Coult. & Rose.*) — Central Neb. to Tex. and N. Mex.

### 29. DISCOPLEÙRA, DC. MOCK BISHOP-WEED.

Calyx-teeth small or obsolete. Fruit ovate, glabrous; carpel with dorsal ribs filiform to broad and obtuse, the lateral very thick and corky, those of the two carpels closely contiguous and forming a dilated obtuse or acute corky band; oil-tubes solitary, stylopodium conical; seed nearly terete. — Smooth branching annuals, with finely dissected leaves, involucre of foliaceous bracts, involucels of prominent or minute bractlets, and white flowers. (Name from *δίσκος, a disk*, and *πλευρόν, a rib.*)

1. **D. capillàcea,** DC. Plant 1 – 2° high (or even 5 – 6°); leaves dissected into filiform divisions; umbel 5 – 20-rayed; involucre of filiform bracts usually cleft or parted, and involucels more or less prominent; fruit 1 – 1½″ long, ovate, acute. — Wet ground, Mass. to Fla., west to Ill., Mo., and Tex. June – Oct.

2. **D. Nuttàllii,** DC. Similar in habit; involucral bracts short and entire; fruit very small (½″ long), as broad as high, blunt. — Ill. (?) to Ark., La., and Tex.

### 30. CONÌUM, L. POISON HEMLOCK.

Calyx-teeth obsolete. Fruit ovate, somewhat flattened at the sides, glabrous, with prominent wavy ribs; oil-tubes none, but a layer of secreting cells next the seed, whose face is deeply and narrowly concave. — Poisonous biennial, with spotted stems, large decompound leaves with lanceolate pinnatifid leaflets, involucre and involucels of narrow bracts, and white flowers. (*Κώνειον*, the Greek name of the Hemlock, by which criminals and philosophers were put to death at Athens.)

**C. MACULÀTUM,** L. A large branching European herb, in waste places, N. Eng. to Penn., and west to Iowa and Minn.

### 31. CHÆROPHÝLLUM, L.

Calyx-teeth obsolete. Fruit narrowly oblong to linear, notched at base, with short beak or none, and equal ribs; oil-tubes solitary in the intervals; seed-face more or less deeply grooved. — Moist ground annuals, with ternately decompound leaves, pinnatifid leaflets with oblong obtuse lobes, mostly no involucre, involucels of many bractlets, and white flowers. (Name from χαίρω, *to gladden*, and φύλλον, *a leaf*, alluding to the agreeable odor of the foliage.)

1. **C. procúmbens,** Crantz. More or less hairy; stems slender, spreading (6 – 18′ high); umbels few-rayed; fruit narrowly oblong (2½ – 3½″ long), glabrous, contracted but not tapering at the summit, the intervals broader than the ribs. — N. Y. to N. C., west to Mich., Iowa, Ark., and Miss.

Var. **Shórtii,** Torr. & Gray, has more broadly oblong to ovate (often somewhat pubescent) fruit, not at all contracted at the summit. — Ky. to Ark. and La.

## 32. OSMORRHÌZA, Raf. Sweet Cicely.

Calyx-teeth obsolete. Fruit linear to linear-oblong, with prominent caudate attenuation at base, very bristly, with equal ribs; oil-tubes obsolete; seed-face concave. — Glabrous to hirsute perennials (1 – 3° high) from thick aromatic roots, with ternately compound leaves, ovate variously toothed leaflets, few-leaved involucres and involucels, and white flowers in few-rayed and few-fruited umbels. (Name from ὀσμή, *a scent*, and ῥίζα, *a root*.)

1. **O. brevístylis,** DC. Rather stout, *villous-pubescent;* leaves 2 – 3-ternate; leaflets 2 – 3′ long, acuminate; fruit (not including the caudate attenuation) 6″ long; *stylopodium and style ½″ long.* — From N. Scotia westward through the Northern States, and in the mountains to N. C. May, June.

2. **O. longístylis,** DC. *Glabrous or slightly pubescent;* like the last, but with the *style 1″ long or more,* and the seed-face more deeply and broadly concave. — N. Scotia to Va., and west to Tenn., E. Kan., and Dak.

## 33. ERIGÈNIA, Nutt. Harbinger-of-Spring.

Calyx-teeth obsolete. Petals obovate or spatulate, flat, entire. Fruit didymous, nearly orbicular and laterally flattened, the carpels incurved at top and bottom, nearly kidney-form, with 5 very slender ribs, and several (1 – 3) small oil-tubes in the intervals; inner face of the seed hollowed into a broad deep cavity. — A small glabrous vernal plant, producing from a deep round tuber a simple stem, bearing one or two 2 – 3-ternately divided leaves, and a somewhat imperfect and leafy-bracted compound umbel. Flowers few, white. (Name from ἠριγένεια, *born in the spring*.)

1. **E. bulbòsa,** Nutt. Stem 3 – 9′ high; leaf-segments linear-oblong; fruit 1″ long, 1½″ broad. — W. New York to Md. and Tenn., and west to Wisc., S. E. Minn., and Kan.

## 34. HYDROCÓTYLE, Tourn. Water Pennywort.

Calyx-teeth obsolete. Fruit strongly flattened laterally, orbicular or shield-shaped; the carpels 5-ribbed, two of the ribs enlarged and often forming a thickened margin; oil-tubes none, but usually a conspicuous oil-bearing layer beneath the epidermis. — Low, mostly smooth, marsh or aquatic perennials, with slender creeping stems, and round shield-shaped or kidney-form leaves, with scale-like stipules. Flowers small, white, in simple umbels or clusters, which are either single or proliferous (one above another), appearing all summer. (Name from ὕδωρ, *water*, and κοτύλη, *a flat cup*, the peltate leaves of several species being somewhat cup-shaped.)

* *Pericarp thin except at the broad corky dorsal and lateral ribs; leaves round-peltate, crenate; peduncles as long as the petioles, from creeping rootstocks.*

+ *Fruit notched at base and apex; intermediate ribs corky.*

1. **H. umbellàta,** L. *Umbels many-flowered, simple* (sometimes proliferous); *pedicels 2–6″ long; fruit about 1½″ broad*, strongly notched, the dorsal ribs prominent but obtuse. — Mass. to Minn., south to the Gulf.

2. **H. Cánbyi,** Coult. & Rose. *Umbels 3–9-flowered, generally proliferous; pedicels very short*, but distinct; *fruit about 2 lines broad:* carpels broader and more flattened than in the preceding, sharper margined, the dorsal and lateral ribs much more prominent; seed section much narrower. (H. umbellata, var.? ambigua, *Gray*, Manual). — N. J. to Md.

+ + *Fruit not notched; intermediate ribs not corky.*

3. **H. verticillàta,** Thunb. Umbels few-flowered, proliferous, forming an interrupted spike; pedicels very short or none; fruit 1½–2″ broad; dorsal and lateral ribs very prominent. (H. interrupta, *Muhl.*) — Mass. to Fla.

* * *Pericarp uniformly corky-thickened and ribs all filiform; leaves not peltate; peduncles much shorter than the petioles.*

+ *Fruit small, without secondary ribs or reticulations; involucre small or none.*

4. **H. Americàna,** L. Stems filiform, *branching and creeping; leaves thin*, round-reniform, *crenate-lobed* and the lobes crenate, shining; few-flowered umbels *axillary and almost sessile;* fruit less than 1″ broad; intermediate ribs prominent; no oil-bearing layer; seed-section broadly oval. — Common.

5. **H. ranunculoìdes,** L. f. *Usually floating; leaves thicker*, round-reniform, 3–7-cleft, the lobes crenate; *peduncles 1–3′ long, reflexed in fruit;* capitate umbel 5–10-flowered; fruit 1–1½″ broad; ribs rather obscure; seed-section oblong. — E. Penn. to Fla., thence westward.

+ + *Fruit larger (2–2½″ broad), with prominent secondary ribs and reticulations; the 2–4-flowered umbel subtended by two conspicuous bracts.*

6. **H. Asiática,** L. Petioles and peduncles (1–2′ long) clustered on creeping stems or runners; leaves ovate-cordate, repand-toothed, thickish; seed-section narrowly oblong. (H. repanda, *Pers.*) — Md. to Fla. and Tex. (Widely distributed in the tropics and southern hemisphere.)

## 35. ERÝNGIUM, Tourn. ERYNGO.

Calyx-teeth prominent, rigid and persistent. Styles slender. Fruit ovate or obovate, covered with little hyaline scales or tubercles, with no ribs, and usually 5 slender oil-tubes on each carpel. — Chiefly perennials, with coriaceous, toothed, cut, or prickly leaves, and blue or white bracted flowers closely sessile in dense heads. (A name used by Dioscorides, of uncertain origin.)

* *Stout, with parallel-veined elongated linear thick leaves.*

1. **E. yuccæfòlium,** Michx. (RATTLESNAKE-MASTER. BUTTON SNAKEROOT.) Branching above, 1–6° high; leaves rigid, tapering to a point (lower sometimes 2–3° long), the margins remotely bristly; heads ovate-globose (9″ long), with ovate-lanceolate mostly entire cuspidate-tipped bracts shorter than the head, and similar bractlets. — Dry or damp soil, N. J. to Minn., south to Fla. and Tex. July–Sept.

* * *Tall and often stout; leaves thick, not parallel-veined.*

2. **E. Virginiànum,** Lam. *Slender* (1 – 3° high); *radical and lower stem-leaves linear- to oblong-lanceolate, on long* (sometimes 1° long) *fistulous petioles,* entire or with small hooked teeth; upper leaves sessile, spiny-toothed or laciniate; heads ovate-oblong (6″ long), with spiny-toothed or entire reflexed bracts, and *bractlets with* 3 *spiny cusps* (the middle one largest). — Margins of ponds and streams, N. J. to Fla. and Tex., near the coast. Aug., Sept.

3. **E. Leavenwórthii,** Torr. & Gray. Stout (1 – 3° high); lowest stem-leaves broadly oblanceolate, spinosely toothed, the rest sessile and *deeply palmately-parted into narrow incisely-pinnatifid spreading pungent segments;* heads ovate-oblong (1 – 1½′ long), with pinnatifid spinose bracts and 3 – 7-cuspidate bractlets, the terminal ones very prominent and resembling the bracts. — Dry soil, E. Kan., Ark., and Tex.

* * * *Prostrate and slender, rooting at the joints, diffusely branched, with small thin unarmed leaves and very small heads.*

4. **E. prostràtum,** Nutt. Lower leaves oblong, entire, few-toothed, or lobed at base; upper leaves smaller, clustered at the rooting joints, ovate, few-toothed or entire (occasionally some additional trifid ones); reflexed bracts longer than the oblong heads (2 – 4″ long). — Wet places, S. Mo. to Fla. and Tex.

### 36. SANÍCULA, Tourn. Sanicle. Black Snakeroot.

Calyx-teeth manifest, persistent. Fruit globular; the carpels not separating spontaneously, ribless, thickly clothed with hooked prickles, each with 5 oil-tubes. — Perennial rather tall glabrous herbs, with few palmately-lobed or parted leaves, those from the root long-petioled. Umbels irregular or compound, the flowers (greenish or yellowish) capitate in the umbellets, perfect, and with staminate ones intermixed. Involucre and involucels few-leaved. (Name said to be from *sano,* to heal; or perhaps from *San Nicolas* )

1. **S. Marylándica,** L. Stem 1 – 3° high; leaves 3 – 7-parted, the divisions mostly sharply cut and serrate; sterile flowers numerous and long-pedicelled; fruit 1½ – 2″ long, the styles longer than the prickles. — Throughout our range, south to Ga. and Tenn., west to E. Kan. and Minn. May – Aug.

Var. **Canadénsis,** Torr., has comparatively few and short-pedicelled sterile flowers, and styles shorter than the prickles. (S. Canadensis, *L.*) — With the last, but westward only to Minn. and E. Kan.

## Order 49. ARALIÀCEÆ. (Ginseng Family)

*Herbs, shrubs, or trees, with much the same characters as* Umbelliferæ, *but with usually more than* 2 *styles, and the fruit a few – several-celled drupe.* — Albumen mostly fleshy. Petals not inflexed.

### 1. ARÀLIA, Tourn. Ginseng. Wild Sarsaparilla.

Flowers more or less polygamous. Calyx-tube coherent with the ovary, the teeth very short or almost obsolete. Petals 5, epigynous, oblong or obovate, lightly imbricated in the bud, deciduous. Stamens 5, epigynous, alternate with the petals. Styles 2 – 5, mostly distinct and slender, or in the sterile flowers short and united. Ovary 2 – 5-celled, with a single anatropous ovule suspended from the top of each cell, ripening into a berry-like drupe, with as many seeds as cells. Embryo minute. — Leaves compound or decompound. Flowers white or greenish, in umbels. Roots (perennial), bark, fruit, etc., warm and aromatic. (Derivation obscure.)

§ 1. ARALIA. *Flowers monœciously polygamous or perfect, the umbels usually in corymbs or panicles; styles and cells of the (black or dark purple) fruit 5; stems herbaceous or woody; ultimate divisions of the leaves pinnate.*

* *Umbels numerous in a large compound panicle; leaves very large, decompound.*

1. **A. spinòsa,** L. (ANGELICA-TREE. HERCULES' CLUB.) *Shrub, or a low tree; the stout stem and stalks prickly;* leaflets ovate, pointed, serrate, pale beneath. — River-banks, Penn. to Ind., and south to the Gulf. July, Aug.

2. **A. racemòsa,** L. (SPIKENARD.) *Herbaceous; stem widely branched; leaflets heart-ovate,* pointed, doubly serrate, slightly downy; umbels racemose; *styles united.* — Rich woodlands, N. Brunswick to Minn., south to the mountains of Ga. July. Well known for its spicy-aromatic large roots.

* * *Umbels 2 – 7, corymbed; stem short, somewhat woody.*

3. **A. híspida,** Vent. (BRISTLY SARSAPARILLA. WILD ELDER.) *Stem* (1 – 2° high) *bristly, leafy,* terminating in a peduncle bearing several umbels; leaves twice pinnate; leaflets oblong-ovate, acute, cut-serrate. — Rocky and sandy places, Newf. to Dak., south to the mountains of N. C. June.

4. **A. nudicaùlis,** L. (WILD SARSAPARILLA.) *Stem scarcely rising out of the ground, smooth, bearing a single long-stalked leaf* (1° high) *and a shorter naked scape,* with 2 – 7 umbels; leaflets oblong-ovate or oval, pointed, serrate, 5 on each of the 3 divisions. — Moist woodlands; range of n. 3. May, June. The long horizontal aromatic roots a substitute for officinal Sarsaparilla.

§ 2. GÍNSENG. *Flowers diœciously polygamous; styles and cells of the red or reddish fruit 2 or 3; stem herbaceous, low, simple, bearing a whorl of 3 palmately 3 – 7-foliolate leaves, and a simple umbel on a slender peduncle.*

5. **A. quinquefòlia,** Decsne. & Planch. (GINSENG.) *Root large and spindle-shaped, often forked* (4 – 9′ long, aromatic); stem 1° high; *leaflets long-stalked,* mostly 5, large and thin, obovate-oblong, pointed; styles mostly 2; *fruit bright red.* — Rich and cool woods, Vt. and W. Conn. to Minn., south to the mountains of Ga. July.

6. **A. trifòlia,** Decsne. & Planch. (DWARF GINSENG. GROUND-NUT.) *Root or tuber globular,* deep in the ground (pungent to the taste, not aromatic); stems 4 – 8′ high; *leaflets 3 – 5, sessile* at the summit of the leafstalk, narrowly oblong, obtuse; styles usually 3; *fruit yellowish.* — Rich woods, N. Scotia to Minn., south to Ga. April, May.

## ORDER 50. CORNÀCEÆ. (DOGWOOD FAMILY.)

*Shrubs or trees (rarely herbaceous), with opposite or alternate simple leaves, the calyx-tube coherent with the 1 – 2-celled ovary, its limb minute, the petals (valvate in the bud) and as many stamens borne on the margin of an epigynous disk in the perfect flowers; style one; a single anatropous ovule hanging from the top of the cell; the fruit a 1 – 2-seeded drupe; embryo nearly* *as long as the albumen, with large foliaceous cotyledons.* — Including two genera, of which Nyssa is partly apetalous. Bark bitter and tonic.

1. **Cornus.** Flowers perfect, 4-merous. Leaves mostly opposite.
2. **Nyssa.** Flowers diœciously polygamous, 5-merous. Leaves alternate.

### 1. CÓRNUS, Tourn. CORNEL. DOGWOOD.

Flowers perfect (or in some foreign species diœcious). Calyx minutely 4-toothed. Petals 4, oblong, spreading. Stamens 4; filaments slender. Style slender; stigma terminal, flat or capitate. Drupe small, with a 2-celled and 2 seeded stone. — Leaves opposite (except in one species), entire. Flowers small, in open naked cymes, or in close heads surrounded by a corolla-like involucre. (Name from *cornu*, a horn; alluding to the hardness of the wood.)

§ 1. *Flowers greenish, in a head or close cluster, surrounded by a large and showy, 4-leaved, corolla-like, white or rarely pinkish involucre; fruit bright red.*

1. **C. Canadénsis,** L. (DWARF CORNEL. BUNCH-BERRY.) *Stems low and simple* (5 – 7′ high) from a slender creeping and subterranean rather woody trunk; leaves scarcely petioled, the lower scale-like, the upper crowded into an apparent whorl in sixes or fours, ovate or oval, pointed; *leaves of the involucre ovate;* fruit globular. — Damp cold woods, N. J. to Ind. and Minn., and the far north and west. June.

2. **C. flórida,** L. (FLOWERING DOGWOOD.) *Tree* 12 – 40° high; leaves ovate, pointed, acutish at the base; *leaves of the involucre obcordate* (1½′ long); *fruit oval.* — Dry woods, from S. New Eng. to Ont. and S. Minn., south to Fla. and Tex. May, June. Very showy in flower, scarcely less so in fruit.

§ 2. *Flowers white, in open flat spreading cymes; involucre none; fruit spherical; leaves all opposite (except in* n. 9).

* *Pubescence woolly and more or less spreading.*

3. **C. circinàta,** L'Her. (ROUND-LEAVED CORNEL OR DOGWOOD.) Shrub 6 – 10° high; *branches greenish,* warty-dotted; *leaves round-oval, abruptly pointed, woolly beneath* (2 – 5′ broad); cymes flat; *fruit light blue.* — Copses, in rich or sandy soil, or on rocks, N. Scotia to Dak., south to Va. and Mo. June.

4. **C. serícea,** L. (SILKY CORNEL. KINNIKINNIK.) Shrub 3 – 10° high; *branches purplish; the branchlets, stalks, and lower surface of the narrowly ovate or elliptical pointed leaves silky-downy* (often rusty), pale and dull; cymes flat, close; calyx-teeth lanceolate; *fruit pale blue.* — Wet places, Canada to Dak., south to Fla. and La. June.

5. **C. asperifòlia,** Michx. *Branches brownish; the branchlets, etc., rough-pubescent; leaves oblong or ovate,* on short petioles, pointed, *rough* with a harsh pubescence *above, and downy beneath;* calyx-teeth minute; fruit white. (C. Drummondii, *Mey.*) — Dry or sandy soil, N. shore of L. Erie to Minn. and the Gulf. May, June. A rather tall shrub.

* * *Pubescence closely appressed, straight and silky, or none.*

6. **C. stolonífera,** Michx. (RED-OSIER DOGWOOD.) *Branches, especially the osier-like shoots* of the season, *bright red-purple, smooth; leaves ovate,* rounded at base, abruptly short-pointed, roughish with a minute close pubescence

on both sides, *whitish underneath;* cymes small and flat, rather few-flowered, smooth; *fruit white or lead-color.* — Wet places; common, especially northward. Multiplies freely by prostrate or subterranean suckers, and forms broad clumps, 3 – 6° high. June.

7. **C. stricta,** Lam. (STIFF CORNEL.) A shrub 8 – 15° high; branches brownish or reddish, smooth; *leaves ovate or ovate-lanceolate,* taper-pointed, acutish at base, *glabrous, of nearly the same hue both sides; cymes loose, flattish; anthers and fruit pale blue.* — Swamps, Va. to Ga. and Fla. April, May.

8. **C. paniculàta,** L'Her. (PANICLED CORNEL.) Shrub 4 – 8° high, much branched; *branches gray, smooth; leaves ovate-lanceolate,* taper-pointed, acute at base, *whitish beneath* but not downy; *cymes convex, loose,* often panicled; *fruit white,* depressed-globose. — Thickets and river-banks. June.

9. **C. alternifòlia,** L. f. Shrub or tree 8 – 25° high; *branches greenish streaked with white, the alternate leaves clustered at the ends,* ovate or oval, long-pointed, acute at base, whitish and minutely pubescent beneath; cymes very broad and open; *fruit deep blue* on reddish stalks. — Hillsides in copses, N. Brunswick to Minn., south to Ga. and Ala. May, June.

## 2. NÝSSA, L. TUPELO. PEPPERIDGE. SOUR-GUM TREE.

Flowers diœciously polygamous, clustered or rarely solitary at the summit of axillary peduncles. *Stam. Fl.* numerous in a simple or compound dense cluster of fascicles. Calyx small, 5-parted. Petals as in fertile flower or none. Stamens 5 – 12, oftener 10, inserted on the outside of a convex disk; filaments slender; anthers short. No pistil. *Pist. Fl.* solitary, or 2 – 8, sessile in a bracted cluster, much larger than the staminate flowers. Calyx with a very short repand-truncate or minutely 5-toothed limb. Petals very small and fleshy, deciduous, or often wanting. Stamens 5 – 10, with perfect or imperfect anthers. Style elongated, revolute, stigmatic down one side. Ovary 1-celled. Drupe ovoid or oblong, with a bony and grooved or striate 1-celled and 1-seeded stone. — Trees with entire or sometimes angulate-toothed leaves, which are alternate, but mostly crowded at the ends of the branchlets, and greenish flowers appearing with the leaves. (The name of a Nymph: "so called because it [the original species] grows in the water.")

1. **N. sylvática,** Marsh. (TUPELO. PEPPERIDGE. BLACK OR SOUR GUM.) Middle-sized tree, with horizontal branches; leaves oval or obovate, commonly acuminate, glabrous or villous-pubescent when young, at least on the margins and midrib, shining above when old (2 – 5′ long); *fertile flowers* 3 – 8, at the summit of a slender peduncle; *fruit ovoid,* acid, *bluish-black* (about ½′ long). (N. multiflora, *Wang.*) — Rich soil, either moist or nearly dry, S. Maine and N. Vt. to Mich., south to Fla. and Tex. April, May. Leaves turning bright crimson in autumn. Wood firm, close-grained and very unwedgeable, on account of the oblique direction and crossing of its fibres.

2. **N. uniflòra,** Wang. (LARGE TUPELO.) A large tree; leaves oblong or ovate, sometimes slightly cordate at base, long-petioled, entire or angulate-toothed, pale and downy-pubescent beneath, at least when young (4 – 12′ long); *fertile flower solitary* on a slender peduncle; *fruit oblong, blue* (1′ or more in length). — Deep swamps, S. Va. to S. Ill. and Mo., south to Fla. and Tex. April. Wood soft; that of the roots very light and spongy.

## DIVISION II. GAMOPETALOUS DICOTYLEDONOUS PLANTS.

Floral envelopes consisting of both calyx and corolla, the latter composed of more or less united petals, that is, gamopetalous.*

### ORDER 51. CAPRIFOLIÀCEÆ. (HONEYSUCKLE FAMILY.)

*Shrubs, or rarely herbs, with opposite leaves, no (genuine) stipules, the calyx-tube coherent with the 2–5-celled ovary, the stamens as many as* (one fewer in Linnæa, doubled in Adoxa) *the lobes of the tubular or rotate corolla, and inserted on its tube.* — Fruit a berry, drupe, or pod, 1 – several-seeded. Seeds anatropous, with small embryo in fleshy albumen.

**Tribe I. SAMBUCEÆ.** Corolla wheel-shaped or urn-shaped, regular, deeply 5-lobed. Stigmas 3–5, sessile or nearly so. Inflorescence terminal and cymose.

* Dwarf herb, with stamens doubled and flowers in a capitate cluster.

1. **Adoxa.** Fruit a dry greenish drupe, with 3–5 cartilaginous nutlets. Cauline leaves a single pair and ternate.

* * Shrubs, with stamens as many as corolla-lobes and flowers in broad compound cymes.

2. **Sambucus.** Fruit berry-like, containing three small seed-like nutlets. Leaves pinnate.
3. **Viburnum.** Fruit a 1-celled 1-seeded drupe, with a compressed stone. Leaves simple.

**Tribe II. LONICEREÆ.** Corolla tubular, often irregular, sometimes 2-lipped. Style slender; stigma capitate.

* Herbs, with axillary flowers.

4. **Triosteum.** Stamens 5. Corolla gibbous at the base. Fruit a 3-celled drupe. Erect; flowers sessile.
5. **Linnæa.** Stamens 4, one fewer than the lobes of the corolla. Fruit dry, 3-celled, but only 1-seeded. Creeping, with long-pedunculate twin flowers.

* * Erect or climbing shrubs, with scaly winter-buds.

6. **Symphoricarpos.** Stamens 4 or 5, as many as the lobes of the bell-shaped regular corolla. Berry 4-celled, but only 2-seeded; two of the cells sterile.
7. **Lonicera.** Stamens 5, as many as the lobes of the tubular and more or less irregular corolla. Berry several-seeded; all the 2 or 3 cells fertile.
8. **Diervilla.** Stamens 5. Corolla funnel-form, nearly regular. Pod 2-celled, 2-valved, many-seeded, slender.

### 1. ADÓXA, L. MOSCHATEL.

Calyx-tube reaching not quite to the summit of the 3–5-celled ovary; limb of 3 or more teeth. Corolla wheel-shaped, 4–6-cleft, bearing at each sinus a pair of separate or partly united stamens with 1-celled anthers. Style 3–5-parted. Dry drupe greenish, with 3–5 cartilaginous nutlets. — A dwarf perennial herb with scaly rootstock and ternately divided leaves, the cauline a single pair. An anomalous genus. (From ἄδοξος, obscure or insignificant.)

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* In certain families, as in Ericaceæ, etc., the petals in some genera are nearly or quite separate. In Compositæ and some others, the calyx is mostly reduced to a pappus, or a mere border, or even to nothing more than a covering of the surface of the ovary. The student might look for these in the first or the third division; but the *artificial analysis* prefixed to the volume provides for such anomalies, and will lead him to the proper order.

1. **A. Moschatéllina,** L. Smooth, musk-scented; radical leaves 1–3-ternate, the cauline 3-cleft or 3-parted; leaflets obovate, 3-cleft; flowers several in a close cluster on a slender peduncle, greenish or yellowish. — N. Iowa, Wisc., and Minn., and northward. (Eu., Asia.)

## 2. SAMBÙCUS, Tourn. ELDER.

Calyx-lobes minute or obsolete. Corolla open urn-shaped, with a broadly spreading 5-cleft limb. Stamens 5. Stigmas 3. Fruit a berry-like juicy drupe, containing 3 small seed-like nutlets. — Shrubby plants, with a rank smell when bruised, pinnate leaves, serrate-pointed leaflets, and numerous small and white flowers in compound cymes. (The Latin name, perhaps from σαμβύκη, an ancient musical instrument.)

1. **S. Canadénsis,** L. (COMMON ELDER.) Stems scarcely woody (5–10° high); *leaflets* 5–11, *oblong*, mostly smooth, the lower often 3-parted; *cymes flat; fruit black-purple.* — Rich soil, in open places, throughout our range, and south and west. June, July. — Pith white.

2. **S. racemòsa,** L. (RED-BERRIED ELDER.) Stems woody (2–12° high), the bark warty; *leaflets* 5–7, *ovate-lanceolate, downy underneath; cymes panicled, convex or pyramidal; fruit bright red* (rarely white). (S. pubens, *Michx.*) — Rocky woods, N. Scotia to Ga., and westward across the continent. May; the fruit ripening in June. — Pith brown. Both species occur with the leaflets divided into 3–5 linear-lanceolate 2–3-cleft or laciniate segments.

## 3. VIBÚRNUM, L. ARROW-WOOD. LAURESTINUS.

Calyx 5-toothed. Corolla spreading, deeply 5-lobed. Stamens 5. Stigmas 1–3. Fruit a 1-celled, 1-seeded drupe, with soft pulp and a thin-crustaceous (flattened or tumid) stone. — Shrubs, with simple leaves, and white flowers in flat compound cymes. Petioles sometimes bearing little appendages which are evidently stipules. Leaf-buds naked, or with a pair of scales. (The classical Latin name, of unknown meaning.)

§ 1. *Cyme radiant, the marginal flowers neutral, with greatly enlarged flat corollas as in* Hydrangea; *drupes coral-red turning darker, not acid; stone sulcate; leaves pinnately veined; winter-buds naked.*

1. **V. lantanoides,** Michx. (HOBBLE-BUSH. AMERICAN WAYFARING-TREE.) Leaves (4–8′ across) round-ovate, abruptly pointed, heart-shaped at the base, closely serrate, the veins and veinlets beneath with the stalks and branchlets very rusty-scurfy; cymes sessile, very broad and flat. — Cold moist woods, N. Brunswick to Ont. and Penn., and in the mountains to N. C. May. A straggling shrub; the reclining branches often taking root.

§ 2. *Cyme peduncled, radiant in* n. 2; *drupe light red, acid, globose; stone very flat, orbicular, not sulcate; leaves palmately veined; winter-buds scaly.*

2. **V. Ópulus,** L. (CRANBERRY-TREE.) Nearly smooth, upright (4–10° high); leaves 3–5-ribbed, strongly 3-lobed, broadly wedge-shaped or truncate at base, the spreading lobes pointed, mostly toothed on the sides, entire in the sinuses; petioles bearing 2 glands at the apex. — Low ground, along streams, from N. Brunswick far westward, and south to Penn. June, July. — The acid fruit is a substitute for cranberries, whence the names *High Cranberry-bush*,

etc. The well-known SNOW-BALL TREE, or GUELDER-ROSE, is a cultivated state, with the whole cyme turned into showy sterile flowers. (Eu.)

3. **V. pauciflòrum,** Pylaie. A low straggling shrub; leaves glabrous or loosely pubescent beneath, 5-ribbed at base, unequally serrate nearly all round, with 3 short lobes at the summit; cyme few-flowered; stamens shorter than the corolla. — Cold woods, Newf. and Lab. to the mountains of N. Eng., westward to N. Mich. and the Rocky Mts.

§ 3. *Cyme never radiant; drupes blue, or dark-purple or black at maturity.*

* *Leaves 3-ribbed from the rounded or subcordate base, somewhat 3-lobed; stipules bristle-shaped.*

4. **V. acerifòlium,** L. (DOCKMACKIE. ARROW-WOOD.) Shrub 3–6° high; leaves soft-downy beneath, the pointed lobes diverging, unequally toothed; cymes small, slender-peduncled; stamens exserted; fruit crimson turning purple; stone lenticular, hardly sulcate. — Cool rocky woods, from N. Brunswick to N. C., and west to S. Minn.

* * *Leaves (with base inclined to heart-shaped) coarsely toothed, prominently pinnately veined; stipules narrowly subulate; no rusty scurf; fruit ovoid, blue or purple; the stone grooved; cymes peduncled.*

+ *Stone flat; leaves all short-petioled or subsessile.*

5. **V. pubéscens,** Pursh. (DOWNY A.) A low, straggling shrub; leaves ovate or oblong-ovate, acute or taper-pointed, the veins and teeth fewer and less conspicuous than in the next, the lower surface and very short petioles soft-downy, at least when young; fruit dark-purple; the stone lightly 2-sulcate on the faces. — Rocks, etc., Lower Canada to the mountains of Ga., west to Iowa and Minn. June.

+ + *Stone very deeply sulcate ventrally; leaves rather slender-petioled.*

6. **V. dentàtum,** L. (ARROW-WOOD.) Smooth, 5–15° high, with ash-colored bark; leaves broadly ovate, very numerously sharp-toothed and strongly veined; fruit 3″ long; cross-section of stone between kidney- and horseshoe-shaped. — Wet places, N. Brunswick to N. Ga., and west to Minn. June. — The pale leaves often with hairy tufts in the axils of the straight veins

7. **V. mólle,** Michx. Leaves broadly oval, obovate or ovate, scarcely pointed, coarsely crenate or repand-toothed, the lower surface, branchlets and cymes soft-downy, the latter with stellate pubescence; fruit oily, larger and more pointed, the stone as in n. 6, but less deeply excavated. — Coast of N. Eng. (Martha's Vineyard), to Tex.

* * * *Leaves finely serrate or entire, bright green; veins not prominent; stipules none; whole plant glabrous or with some minute rusty scurf; fruit black or with a blue bloom, sweet; stone very flat and even, broadly oval or orbicular.*

+ *Cymes peduncled, about 5-rayed; drupes globose-ovoid, 3″ long; shrubs 5–12° high, in swamps.*

8. **V. cassinoìdes,** L. (WITHE-ROD.) Shoots scurfy-punctate; leaves thickish and *opaque or dull,* ovate to oblong, mostly with obtuse acumination, *obscurely veiny* (1–3′ long), *with margins irregularly crenulate-denticulate* or sometimes entire; *peduncle shorter than the cyme.* (V. nudum, var. cassinoides, *Torr. & Gray.*) — Newf. to N. J. and Minn. Flowers earlier than the next.

9. **V. nùdum,** L. Obscurely scurfy-punctate; *leaves*
ish, oval, oblong or lanceolate, entire or obsoletely denticulate, high, branches
4′ long); *peduncle usually equalling the cyme.* — N. J. to Fla. when old;

+ + *Compound cymes sessile, 3 – 5-rayed; drupes oval, 5 – 7″ lo.* *2-lipped* Bogs,

10. **V. Lentàgo,** L. (SWEET VIBURNUM. SHEEP-BERRY.) *Leaves ova.* *strongly pointed*, closely and very *sharply serrate;* petioles long and margined; cyme large; fruit oval, ½′ long or more, ripe in autumn, edible; tree 15 – 30° high. — Woods and banks of streams, from the Atlantic to Mo., Minn., and northward. Fl. in spring.

11. **V. prunifòlium,** L. (BLACK HAW.) *Leaves oval, obtuse* or slightly pointed, *finely and sharply serrate*, smaller than in the preceding (1 – 2′ long); fruit similar or rather smaller. — Dry or moist ground, N. Y. to Mich., Kan., and southward. Flowering early. — A tall shrub or small tree.

12. **V. obovàtum,** Walt. Shrub 2 – 8° high; leaves obovate or spatulate, obtuse, entire or denticulate, thickish, small (1 – 1½′ long), shining; cymes small; fruit 5″ long, black. — River-banks and swamps, Va. to Fla. May.

## 4. TRIÓSTEUM, L. FEVER-WORT. HORSE-GENTIAN.

Calyx-lobes linear-lanceolate, leaf-like, persistent. Corolla tubular, gibbous at base, somewhat equally 5-lobed, scarcely longer than the calyx. Stamens 5. Ovary mostly 3-celled, in fruit forming a rather dry drupe, containing as many ribbed 1-seeded bony nutlets. — Coarse, hairy, perennial herbs, leafy to the top; the ample entire pointed leaves tapering to the base, but connate round the simple stem. Flowers sessile, solitary or clustered in the axils. (Name an abbreviation of *Triosteospermum*, alluding to the three bony nutlets.)

1. **T. perfoliàtum,** L. *Softly hairy* (2 – 4° high); *leaves oval, abruptly narrowed below*, downy beneath; flowers brownish-purple, mostly clustered; fruit orange-color, ½′ long. — Rich woodlands, Canada and N. Eng. to Minn., Iowa, and Ala. June. Also called TINKER'S-WEED, WILD COFFEE, etc.

2. **T. angustifòlium,** L. Smaller, *bristly-hairy; leaves lanceolate, tapering to the base;* flowers greenish-cream-color, mostly single in the axils. — Shady grounds, Va. to Ill., Mo., and Ala. May.

## 5. LINNÆA, Gronov. TWIN-FLOWER.

Calyx-teeth 5, awl-shaped, deciduous. Corolla narrow bell-shaped, almost equally 5-lobed. Stamens 4, two of them shorter, inserted toward the base of the corolla. Ovary and the small dry pod 3-celled, but only 1-seeded, two of the cells having only abortive ovules. — A slender creeping and trailing little evergreen, somewhat hairy, with rounded-oval sparingly crenate leaves contracted at the base into short petioles, and thread-like upright peduncles forking into 2 pedicels at the top, each bearing a delicate and fragrant nodding flower. Corolla purple and whitish, hairy inside. (Dedicated to the immortal *Linnæus*, who first pointed out its characters, and with whom this pretty little plant was a special favorite.)

1. **L. boreàlis,** Linnæus. — Moist mossy woods and cold bogs, N. Eng. to N. J. and the mountains of Md., west to Minn.; also far north and west. June. (Eu.)

etc. The well-kn

### PHORICÁRPOS, Dill. SNOWBERRY.

state, with the
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short, persistent. Corolla bell-shaped, regularly 4 – 5-lobed, with hort stamens inserted into its throat. Ovary 4-celled, only 2 of the ith a fertile ovule; the berry therefore 4-celled but only 2-seeded. Seeds ny. — Low and branching upright shrubs, with oval short-petioled leaves, which are downy underneath and entire, or wavy toothed or lobed on the young shoots. Flowers white tinged with rose-color, in close short spikes or clusters. (Name composed of *συμφορέω, to bear together*, and *καρπός, fruit;* from the clustered berries.)

* *Style bearded; fruit red; flowers all in short dense axillary clusters.*

1. **S. vulgàris,** Michx. (INDIAN CURRANT. CORAL-BERRY.) Flowers in the axils of nearly all the leaves; corolla sparingly bearded; berries small. — Rocky banks, western N. Y. and Penn. to Dak., Neb., and Tex. July.

* * *Style glabrous; fruit white; flowers in clusters or sometimes solitary.*

2. **S. occidentàlis,** Hook. (WOLFBERRY.) *Flowers in dense terminal and axillary spikes;* corolla much bearded within; stamens and style protruded. — Rocky ground, N. Mich. and Ill., west to the Rocky Mts. — Flowers larger and more funnel-form, and stamens longer, than in the next.

3. **S. racemòsus,** Michx. (SNOWBERRY.) *Flowers in a loose and somewhat leafy interrupted spike* at the end of the branches; corolla bearded inside; berries large. — Rocky banks, N. New Eng. and Penn., to Minn. and westward; common in cultivation. June – Sept. Berries ripe in autumn. — Var. PAUCIFLÒRUS, Robbins. Low, diffusely branched and spreading; leaves smaller (about 1′ long), the spike reduced to one or two flowers in the uppermost axils. — Mountains of Vt. and Penn. to Minn., Dak., and westward.

### 7. LONÍCERA, L. HONEYSUCKLE. WOODBINE.

Calyx-teeth very short. Corolla tubular or funnel-form, often gibbous at the base, irregularly or almost regularly 5-lobed. Stamens 5. Ovary 2 – 3-celled. Berry several-seeded. — Leaves entire. Flowers often showy and fragrant. (Named in honor of *Adam Lonitzer*, latinized *Lonicerus*, a German herbalist of the 16th century.)

§ 1. XYLÓSTEON. *Upright bushy shrubs; leaves all distinct; peduncles axillary, single, 2-flowered at the summit; the two berries sometimes united into one; calyx-teeth not persistent.*

* *Bracts* (2 *or sometimes* 4) *at the base of the ovaries minute.*

1. **L. ciliàta,** Muhl. (FLY-HONEYSUCKLE.) Branches straggling (3 – 5° high); *leaves oblong-ovate, often heart-shaped, petioled, thin,* downy beneath; *filiform peduncles shorter than the leaves;* corolla funnel-form, almost spurred at the base (greenish-yellow, ¾′ long), the lobes nearly equal; *berries separate (red).* — Rocky woods, N. Brunswick to Penn. and Minn. May.

2. **L. cærùlea,** L. (MOUNTAIN F.) Low (1 – 2° high); branches upright; *leaves oval,* downy when young; *peduncles very short; bracts awl-shaped, longer than the ovaries, which are united into one (blue) berry;* flowers yellowish. — Mountain woods and bogs, Lab. to R. I., Minn., and northward. May. (Eu.)

3. **L. oblongifòlia,** Muhl. (SWAMP F.) Shrub 2–5° high, branches upright; *leaves* (2–3′ long) *oblong,* downy when young, smooth when old; *peduncles long and slender; bracts minute or deciduous; corolla deeply 2-lipped* (½′ long, yellowish-white); *berries* (*purple*) *united* or nearly distinct. — Bogs, N. New Eng. and N. Y., to Minn. June.

* * *The two flowers involucrate by* 4 *conspicuous and broad foliaceous bracts.*

4. **L. involucràta,** Banks. Pubescent, or becoming glabrous; branches 4-angular; leaves (2–5′ long) ovate-oblong, mostly pointed, petioled, and with a strong midrib, exceeding the peduncle; corolla yellowish, viscid-pubescent, cylindraceous (6–8″ long); ovaries and globose dark-purple berries distinct. — Deep woods; shores of L. Superior, and north and westward.

§ 2. CAPRIFÒLIUM. *Twining shrubs, with the flowers in sessile whorled clusters from the axils of the* (*often connate*) *upper leaves, forming interrupted terminal spikes; calyx-teeth persistent on the* (*red or orange*) *berry.*

* *Corolla trumpet-shaped, almost regular; stamens and style little exserted.*

5. **L. sempérvirens,** Ait. (TRUMPET HONEYSUCKLE.) Flowers in somewhat distant whorls, scentless, nearly 2′ long, deep red outside, yellowish within or rarely throughout; leaves oblong, smooth, the lower petioled, the uppermost pairs connate. — Copses, Conn. to Ind., and southward; common in cultivation. May–Oct. — Leaves deciduous at the north.

* * *Corolla ringent; the lower lip narrow, the upper broad and 4-lobed; stamens and style conspicuously exserted.*

+ *Corolla-tube an inch long, glabrous inside; stamens and style glabrous.*

6. **L. gràta,** Ait. (AMERICAN WOODBINE.) Leaves smooth, glaucous beneath, obovate, the 2 or 3 upper pairs united; flowers whorled in the uppermost axils; corolla whitish with a purple tube, fading yellowish, not gibbous at base, fragrant. — Rocky woodlands, N. J. and Penn. to Mich. and Mo., and southward; also cultivated. May.

+ + *Corolla hairy within, the tube 6″ long or less.*

7. **L. hirsùta,** Eaton. (HAIRY HONEYSUCKLE.) Twining and rather high-climbing; leaves deep green above, downy-hairy beneath, as well as the branches, veiny, dull, broadly oval, the uppermost united, the lower short-petioled; flowers in approximate whorls; tube of the (orange-yellow) clammy-pubescent corolla gibbous at base, slender. — Damp copses and rocks, Maine to Penn., Mich., and Minn. July. — A coarse large-leaved species.

8. **L. Sullivántii,** Gray. At length *much whitened with glaucous bloom,* 3–6° high, glabrous; leaves oval and obovate-oblong (2–4′ long), sessile and mostly connate on the flowering stems, the uppermost into an orbicular disk; corolla pale yellow; *filaments nearly glabrous.* (L. flava of former edition, mainly.) — Ohio to Ill., Minn., and L. Winnipeg; also in Tenn. and N. C.

9. **L. glaùca,** Hill. Glabrous, or lower leaf-surface sometimes puberulent, 3–5° high; leaves oblong (2–3′ long), glaucous but less whitened than in the last, the 1–4 *upper pairs connate;* corolla greenish-yellow or purplish; *tube only* 3–4″ *long, within and also style and base of filaments hirsute.* (L. parviflóra, *Lam.*, and part of var. Douglásii, *Gray.*) — Rocky grounds, N. Eng. and Penn. to Minn., and northward.

### 8. DIERVÍLLA, Tourn. BUSH-HONEYSUCKLE.

Calyx-tube tapering at the summit; the lobes slender, awl-shaped, persistent. Corolla funnel-form, 5-lobed, almost regular. Stamens 5. Pod ovoid-oblong, pointed, 2-celled, 2-valved, septicidal, many-seeded. — Low upright shrubs, with ovate or oblong pointed serrate leaves, and cymosely 3 – several-flowered peduncles, from the upper axils or terminal. (Named in compliment to *Dr. Dierville*, who brought it from Canada to Tournefort.)

1. **D. trífida,** Moench. Leaves oblong-ovate, taper-pointed, petioled; peduncles mostly 3-flowered; pod long-beaked. — Rocks, Newf. to the mountains of N. C., west to Minn. June - Aug. — Flowers honey-color, not showy, as are the Japanese species cultivated under the name of WEIGELA.

## ORDER 52. RUBIÀCEÆ. (MADDER FAMILY.)

*Shrubs or herbs, with opposite entire leaves connected by interposed stipules, or in whorls without apparent stipules, the calyx coherent with the* 2 – 4-*celled ovary, the stamens as many as the lobes of the regular corolla* (4 – 5), *and inserted on its tube.* — Flowers perfect, but often dimorphous (as in Mitchella and Houstonia). Fruit various. Seeds anatropous or amphitropous. Embryo commonly pretty large, in copious hard albumen. — A very large family, the greater part, and all its most important plants (such as the Coffee and Peruvian-Bark trees), tropical.

I. CINCHONEÆ. Ovules numerous in each cell; leaves opposite.

1. **Houstonia.** Corolla salver-form or funnel-form, 4-lobed. Seeds rather few, thimble-shaped or saucer-shaped. Low herbs.
2. **Oldenlandia.** Corolla wheel-shaped in our species, 4-lobed. Seeds very numerous and minute, angular. Low herbs.

II. COFFEINEÆ. Ovules solitary in the cells; leaves mostly opposite.

+ Flowers in a close and globose long-peduncled head. Fruit dry. Shrubs.

3. **Cephalanthus.** Corolla tubular; lobes 4. Fruit inversely pyramidal, 2 – 4-seeded.

+ + Flowers twin; their ovaries united into one. Fruit a 2-eyed berry.

4. **Mitchella.** Corolla funnel-form; its lobes 4. A creeping herb.

+ + + Flowers axillary, separate. Fruit dry when ripe. Herbs.

5. **Spermacoce.** Corolla funnel-form or salver-form; lobes 4. Fruit separating when ripe into 2 carpels, one or both of them opening.
6. **Diodia.** Fruit separating into 2 or 3 closed and indehiscent carpels; otherwise as n. 5.

III. STELLATÆ. Ovules solitary; leaves in whorls, without stipules.

7. **Galium.** Corolla wheel-shaped, 4- (or rarely 3-) parted. Calyx-teeth obsolete. Fruit twin, separating into 2 indehiscent 1-seeded carpels.
8. **Sherardia.** Corolla funnel-form. Calyx-lobes lanceolate. Flowers subsessile, involucrate.

### 1. HOUSTÒNIA, L.

Calyx 4-lobed, persistent; the lobes in fruit distant. Corolla salver-form or funnel-form, usually much longer than the calyx-lobes, 4-lobed, the lobes valvate in the bud. Stamens 4; anthers linear or oblong. Style 1; stigmas 2. Ovary 2-celled. Pod top-shaped, globular, or didymous, thin, its summit or upper half free from and projecting beyond the tube of the calyx, loculicidal across the top. Seeds rather few (4–20 in each cell), peltate and saucer-shaped or globular-thimble-shaped, pitted. — Small herbs, with short entire stipules connecting the petioles or narrowed bases of the leaves, and cymose or solitary and peduncled flowers. These are dimorphous, in some individuals with exserted anthers and short included style; in others the anthers included and the style long, the stigmas therefore protruding. (Named for *Dr. Wm. Houston*, an English botanist who collected in Central America.)

∗ *Small and delicate, vernal-flowering; peduncles 1-flowered; corolla salverform; upper half of the broad and somewhat 2-lobed pod free; seeds globular, with a very deep round cavity occupying the inner face.*

+– *Perennial by delicate filiform creeping rootstocks or creeping stems; peduncles filiform, 1–2′ long.*

1. **H. cærùlea,** L. (Bluets. Innocence.) Glabrous; *stems erect*, slender, sparingly branched from the base (3–5′ high); *leaves oblong-spatulate* (3–4″ long); peduncle filiform, erect; corolla *light blue*, pale lilac or nearly white with a yellowish eye, with tube much longer than its lobes or than those of the calyx. — Moist and grassy places, N. Eng. to Ga., west to Mich. and Ala.; producing from early spring to midsummer its delicate little flowers.

2. **H. serpyllifòlia,** Michx. Like the last, but filiform *stems prostrate*, extensively creeping and rooting; *leaves orbicular to ovate* (2–4″ long); corolla rather larger, and *deep violet-blue*. — Along streamlets and on mountain-tops, Va. to Tenn. and S. C.

+– +– *Winter-annuals, branching from the simple root; peduncles much shorter.*

3. **H. pàtens,** Ell. An inch to at length a span high, with ascending branches and erect peduncles; leaves spatulate to ovate; corolla much smaller than that of n. 1, violet-blue or purplish without yellowish eye, *the tube longer than its lobes, twice the length of the calyx-lobes.* — Dry or sandy soil, S. Va. to Tex. and Ill. (?)

4. **H. mínima,** Beck. More diffuse, *commonly scabrous*; stems at length much branched and spreading (1–4′ high); lowest leaves ovate or spatulate, the upper oblong or nearly linear; earlier peduncles elongated and spreading in fruit, the later ones short; *tube of the purplish corolla not longer than its lobes or the ample calyx-lobes* (1½″ long). — Dry hills, Mo. to Tex. March–May.

∗ ∗ *Erect, mostly perennial herbs (6–20′ high), with stem-leaves sessile, and flowers in small terminal cymes or clusters; corolla funnel-form, purplish, often hairy inside; seeds meniscoidal, with a ridge across the hollowed inner face.*

5. **H. purpùrea,** L. Pubescent or smooth (8–15′ high); *leaves varying from roundish-ovate to lanceolate*, 3–5-ribbed; calyx-lobes longer than the *half-free globular pod*. — Woodlands, Md. to Ark., and southward. May–July. — Varying wonderfully, as into —

Var. **ciliolàta,** Gray. A span high; leaves only ½′ long, thickish; cauline oblong-spatulate; radical oval or oblong, rosulate, hirsute-ciliate; calyx-lobes a little longer than the pod. — Rocky banks, from the Great Lakes and Minn. to Ky.; passing into

Var. **longifòlia,** Gray. A span or two high, mostly glabrous, thinner-leaved; leaves oblong-lanceolate to linear (6–20″ long); radical oval or oblong, less rosulate, not ciliate. — Rocky or gravelly ground, Maine to Minn., south to Ga. and Mo.; also northward.

Var. **tenuifòlia,** Gray. Slender, lax, diffuse, 6 – 12′ high, with loose inflorescence, and almost filiform branches and peduncles; cauline leaves all linear, hardly over 1″ wide. — S. E. Ohio to Va., N. C., and Tenn.

Var. **calycòsa,** Gray. Almost 1° high; leaves broadly lanceolate, thickish; calyx-lobes elongated (2 – 4″ long), much surpassing the pod. — From Ill. (*Hall*) to Ark. and N. Ala.

6. **H. angustifòlia,** Michx. Stems tufted from a hard or woody root; *leaves narrowly linear,* acute, 1-ribbed, many of them fascicled; flowers crowded, short-pedicelled; lobes of the corolla densely bearded inside; *pod obovoid, acute at base, only its summit free,* opening first across the top, at length through the partition. — Barrens, Ill. to Kan., south to Tex., Tenn., and Fla.

## 2. OLDENLÁNDIA, Plumier.

Calyx 4-lobed, persistent. Corolla short, in our species wheel-shaped; the limb 4-parted, valvate in the bud. Stamens 4; anthers short. Style 1 or none; stigmas 2. Pod thin, 2-celled, many-seeded, opening loculicidally across the summit. Seeds very numerous, minute and angular. — Low herbs, with small stipules united to the petioles. (Dedicated to the memory of *Oldenland*, a German physician and botanist, who died early at the Cape of Good Hope.)

1. **O. glomeràta,** Michx. An inconspicuous, pubescent or smoothish, branched and spreading annual (2 – 12′ high); leaves ovate to oblong; flowers in sessile axillary clusters; corolla nearly wheel-shaped (white), much shorter than the calyx. — Wet places, near the coast, N. Y. to Fla. and Tex.

## 3. CEPHALÁNTHUS, L. Button-bush.

Calyx-tube inversely pyramidal, the limb 4-toothed. Corolla tubular, 4-toothed; the teeth imbricated in the bud. Style thread-form, much protruded. Stigma capitate. Fruit dry and hard, small, inversely pyramidal, 2 – 4-celled, at length splitting from the base upward into 2 – 4 closed 1-seeded portions. — Shrubs, with the white flowers densely aggregated in spherical peduncled heads. (Name composed of *κεφαλή, a head*, and *ἄνθος, a flower.*)

1. **C. occidentàlis,** L. Smooth or pubescent; leaves petioled, ovate or lanceolate-oblong, pointed, opposite or whorled in threes, with short intervening stipules. — Swamps and along streams, throughout the continent. July, Aug.

## 4. MITCHÉLLA, L. Partridge-berry.

Flowers in pairs, with their ovaries united. Calyx 4-toothed. Corolla funnel-form, 4-lobed; the lobes spreading, densely bearded inside, valvate in the bud. Stamens 4. Style 1; stigmas 4, linear. Fruit a berry-like double drupe, crowned with the calyx-teeth of the two flowers, with 4 small seed-like bony nutlets to each flower. — A smooth and trailing small evergreen herb, with round-ovate and shining petioled leaves, minute stipules, white fragrant flowers often tinged with purple, and scarlet edible (but nearly tasteless) berries, which remain over winter. Flowers occasionally 3 – 6-merous, always dimorphous; all those of some individuals having exserted stamens and included stigmas; of others, included stamens and exserted style. (This very pretty plant commemorates *Dr. John Mitchell*, an early correspondent of Linnæus, and an excellent botanist, who resided in Virginia.)

1. **M. rèpens,** L. — Dry woods, creeping about the foot of trees, especially Coniferæ, throughout our range and southward. June, July. — Leaves often variegated with whitish lines Rarely the two flowers are completely confluent into one, with a 10-lobed corolla.

### 5. SPERMACÒCE, Dill. Button-weed.

Calyx-tube short; the limb parted into 4 teeth. Corolla funnel-form or salver-form, valvate in the bud. Stamens 4. Stigma or style 2-cleft. Fruit small and dry, 2 celled, 2-seeded, splitting when ripe into 2 carpels, one of them usually carrying with it the partition, and therefore closed, the other open on the inner face. — Small herbs, the bases of the leaves or petioles connected by a bristle-bearing stipular membrane Flowers small, whitish, crowded into sessile axillary whorled clusters or heads. (Name compounded of *σπέρμα, seed*, and *ακωκή, a point*, probably from the pointed calyx-teeth on the fruit.)

1. **S. glàbra,** Michx. Glabrous perennial; stems spreading (9 – 20′ long); leaves oblong-lanceolate; heads many-flowered; corolla little exceeding the calyx, bearded in the throat, bearing the anthers at its base, filaments and style hardly any. — River-banks, S. Ohio to Ark., Tex., and Fla. Aug.

### 6. DIÒDIA, Gronov. Button-weed.

Calyx-teeth 2 - 5, often unequal. Fruit 2- (rarely 3-) celled; the crustaceous carpels into which it splits all closed and indehiscent. Flowers 1 – 3 in each axil. Otherwise resembling Spermacoce. Flowering all summer. (Name from *δίοδος, a thoroughfare;* the species often growing by the wayside.)

1. **D. Virginiàna,** L Smooth or hairy perennial; stems spreading (1 – 2° long); leaves lanceolate or oblong-lanceolate, sessile. corolla white (½′ long), the *slender tube abruptly expanded into the large limb; style 2-parted, fruit oblong, strongly furrowed*, crowned mostly with 2 slender calyx-teeth — Low grounds along streams, southern N. J to Fla., west to Ark. and Tex.

2. **D. tères,** Walt. Hairy or minutely pubescent annual; stem spreading (3 – 9′ long), nearly terete; leaves linear-lanceolate, closely sessile, rigid; *corolla funnel-form* (2 - 3″ long, whitish), with short lobes, not exceeding the long bristles of the stipules: *style undivided; fruit* obovate-turbinate, *not furrowed*, crowned with 4 short calyx-teeth. — Sandy soil, N J. to W. Ill., Fla., and Tex.

### 7. GÀLIUM, L. Bedstraw. Cleavers

Calyx-teeth obsolete. Corolla 4-parted, rarely 3-parted, wheel-shaped, valvate in the bud. Stamens 4, rarely 3, short. Styles 2. Fruit dry or fleshy, globular, twin, separating when ripe into the 2 seed-like, indehiscent, 1-seeded carpels. — Slender herbs, with small cymose flowers (produced in summer), square stems, and whorled leaves, the roots often containing a red coloring matter. (Name from *γάλα, milk*, which some species are used to curdle.)

§ 1. *Naturalized species; fruit dry.*

**G. vèrum,** L. (Yellow Bedstraw.) Perennial; stems smooth, erect; leaves 8 or sometimes 6 in the whorls, linear, roughish, soon deflexed; flowers very numerous, paniculate, yellow; fruit usually smooth. — Dry fields, E. Mass. (Nat. from Eu.)

**G.** Mollùgo, L. Perennial, smooth throughout; stems erect or diffuse, 2 or 3° long; leaves 8, or 6 on the branchlets, oblanceolate to nearly linear; flowers very numerous in ample almost leafless panicles; fruit smooth. — Roadsides and fields, N. Y. and Penn. (Nat. from Eu.)

**G.** Ánglicum, Huds. Annual, slender, diffuse, seldom 1° high, glabrous; leaves 5-7, oblanceolate to nearly linear (3″ long), their margins and the angles of the stem spinulose-scabrous; flowers rather few, cymulose on leafy branches, greenish-white, very small; fruit glabrous, more or less tuberculate. — Roadsides, Bedford Co., Va. (*Curtiss*). (Nat. from Eu.)

**G.** tricórne, With. Annual, resembling *G. Aparine,* rather stout, with simple branches; leaves 6 or 8, oblanceolate, cuspidate-mucronate, the margins and stem retrorsely prickly-hispid; flowers mostly in clusters of 3, dull white; fruits rather large, tuberculate-granulate, not hairy, pendulous. — Fields, eastward. (Nat. from Eu.)

§ 2. *Indigenous species; fruit dry.*

* *Annual; leaves about* 8 *in a whorl; peduncles* 1-3-*flowered, axillary; fruit bristly with hooked prickles.*

1. **G. Aparìne,** L. (Cleavers. Goose-Grass.) Stem weak and reclining, bristle-prickly backward, hairy at the joints; leaves lanceolate, tapering to the base, short-pointed, rough on the margins and midrib (1-2′ long); flowers white. — Shaded grounds, throughout the continent; probably as an introduced plant eastward.

* * *Perennials; leaves in* 4*'s, comparatively large, and broad* (*narrower in* n. 7 *and* 8), *not cuspidate-pointed, more or less distinctly* 3-*nerved; fruit uncinate-hispid* (*except in* n. 6 *and* 7).

+ *Peduncles loosely* 3-*several-flowered; flowers dull purple to yellowish-white.*

2. **G. pilòsum,** Ait. *Hairy; leaves oval,* dotted, hairy (1′ long), the lateral nerves obscure; *peduncles* 2-3-*forked, the flowers all pedicelled.* — Dry copses, R. I. and Vt. to Ill., E. Kan., and southward.

Var. **puncticulòsum,** Torr. & Gray. Almost glabrous; leaves varying to elliptical-oblong, hispidulous-ciliate. — Va. to Tex.

3. **G. Kamtschàticum,** Steller. Stems weak, mainly glabrous (1° high); *leaves orbicular* to oblong-ovate, thin (½-1′ long), slightly pilose; flowers slenderly pedicellate; *corolla glabrous, yellowish-white,* not turning dark, *its lobes merely acute.* (G. circæzans, var. montanum, *Torr. & Gray.*) — Higher mountains of N. Eng., L. Canada, and far westward. (Asia.)

4. **G. circæ̀zans,** Michx. (Wild Liquorice.) Smooth or downy (1° high); *leaves oval,* varying to ovate-oblong, *mostly obtuse,* ciliate (1-1½′ long); *peduncles usually once forked, the branches elongated* and widely diverging in fruit, *bearing several remote flowers on very short lateral pedicels,* reflexed in fruit; lobes of the *greenish corolla hairy outside, acute or acuminate.* — Rich woods, N. Eng. to Minn., south to Fla. and Tex.

5. **G. lanceolàtum,** Torr. (Wild Liquorice.) Nearly glabrous; *leaves* (except the lowest) *lanceolate or ovate-lanceolate, tapering to the apex* (2′ long); *corolla glabrous, yellowish turning dull purple, lobes more acuminate;* otherwise like the last. — Dry woods, N. Eng. to N. Mich. and Minn.

6. **G. latifòlium,** Michx. Smooth (1-2° high); *leaves lanceolate or ovate-lanceolate,* acute (2′ long), the midrib and margins rough; cymes panicled,

loosely many-flowered, the purple flowers on *slender spreading pedicels; fruit smooth*, rather fleshy. — Dry woods, mountains of Penn. to N. C. and Tenn.

7. **G. Arkansànum,** Gray. Similar but lower; leaves lanceolate to linear (1′ long or less), the lateral nerves obscure or none. — S. Mo. and Ark.

+ + *Leaves narrow; flowers bright white, numerous in a compact panicle.*

8. **G. boreàle,** L. (NORTHERN BEDSTRAW.) Smooth (1 – 2° high); leaves linear-lanceolate; fruit minutely bristly, sometimes smooth. — Rocky banks of streams, Maine to Penn., Iowa, Minn., and westward. (Eu., Asia.)

* * *Leaves in* 4's, 5's, *or* 6's, *small*, 1-*nerved; flowers white; fruit smooth* (*flowers greenish and fruit hispid in* n. 12.)

+ *Leaves pointless.*

9. **G. trífidum,** L. (SMALL BEDSTRAW.) Stems weak, ascending (5 – 20′ high), branching, mostly roughened backwards on the angles; *leaves in whorls of* 4 *to* 6, linear or oblanceolate, the margins and midrib rough; *peduncles scattered*, 1 – 7-*flowered;* corolla-lobes and stamens often only 3. — Sphagnous bogs and wet ground, throughout the continent. Exceedingly variable. — Var. PUSÍLLUM, Gray, the smallest form; leaves only in 4's, 3 – 4″ long, narrow, in age often reflexed; peduncles 1-flowered. In cold bogs, northward. — Var. LATIFÒLIUM, Torr., the larger and broadest-leaved form; leaves 6 or 7″ long, often 2″ wide. From Canada, south and west. (Eu., Asia.)

10. **G. concínnum,** Torr. & Gray. Stems low and slender (6 – 12′ high), with minutely roughened angles; *leaves all in* 6's, *linear, slightly pointed*, veinless, the margins upwardly roughened; *peduncles* 2–3 *times forked, diffusely panicled;* pedicels short. — Dry hills, Penn. to Va., west to Minn., Iowa, and Ark.

+ + *Leaves cuspidately mucronate or acuminate.*

11. **G. aspréllum,** Michx. (ROUGH BEDSTRAW.) *Stem* much branched, *rough backwards with hooked prickles*, leaning on bushes (3 – 5° high); *leaves in whorls of* 6, *or* 4 – 5 *on the branchlets, oval-lanceolate*, with almost prickly margins and midrib; peduncles short, 2 – 3 times forked. — Alluvial ground, N. Eng. to N. C., west to Minn., Iowa, and Mo.

12. **G. triflòrum,** Michx. (SWEET-SCENTED BEDSTRAW.) Stem (1 – 3° long) bristly-roughened backward on the angles; leaves elliptical-lanceolate, bristle-pointed, with slightly roughened margins (1 – 2′ long); peduncles 3-flowered, the flowers all pedicelled, greenish; fruit beset with hooked bristles. — Rich woodlands, throughout the continent. Sweet-scented in drying. (Eu.)

§ 3. *Perennial; fruit a berry; leaves in* 4's, 1-*nerved.*

13. **G. hispídulum,** Michx. Hirsute-pubescent, scabrous, or sometimes nearly smooth, 1 – 2° high, diffusely branched; leaves oblong or oval, mucronate (3 – 6″ long), pedicels solitary or commonly 2 or 3 from the small involucral whorl, all naked, or one of them bracteolate; flowers white; berry purple, glabrate. — Dry or sandy soil, southern N. J. to Fla., along the coast.

## 8. SHERÁRDIA, Dill.

Calyx-lobes lanceolate, persistent. Corolla funnel-form, the limb 4 – 5-lobed. Stamens 4 – 5. Style filiform, 2-cleft; stigmas capitate. Fruit dry, twin, of 2 indehiscent 1-seeded carpels. — A slender procumbent herb, with square stems, lanceolate pungent leaves in whorls of 4 – 6, and small subsessile blue or pinkish flowers surrounded by a gamophyllous involucre. (Named for *Dr. William Sherard*, patron of Dillenius.)

S. ARVÉNSIS, L. The only species; sparingly naturalized from Eu.

## ORDER 53. VALERIANÀCEÆ. (VALERIAN FAMILY.)

*Herbs, with opposite leaves and no stipules; the calyx-tube coherent with the ovary, which has one fertile* 1-*ovuled cell and two abortive or empty ones; the stamens distinct*, 1 – 3, *fewer than the lobes of the corolla, and inserted on its tube.* — Corolla tubular or funnel-form, often irregular, mostly 5-lobed, the lobes imbricated in the bud. Style slender; stigmas 1 – 3. Fruit indehiscent, 1-celled (the two empty cells of the ovary disappearing), or 3-celled, two of them empty, the other 1-seeded. Seed suspended, anatropous, with a large embryo and no albumen. — Flowers in panicled or clustered cymes. (Roots often odorous and antispasmodic.)

### 1. VALERIÀNA, Tourn. VALERIAN.

Limb of the calyx of several plumose bristles (like a pappus) which are rolled up inward in flower, but unroll and spread as the seed-like 1-celled fruit matures. Corolla commonly gibbous near the base, the 5-lobed limb nearly regular. Stamens 3. — Perennial herbs, with thickened strong-scented roots, and simple or pinnate leaves. Flowers in many species imperfectly diœcious or dimorphous. (A mediæval Latin name of uncertain origin.)

* *Root spindle-shaped, large and deep* (6 – 12′ *long*); *leaves thickish.*

1. **V. édulis**, Nutt. Smooth, or minutely downy when very young; stem straight (1 – 4° high), few-leaved; leaves commonly minutely and densely ciliate, those of the root spatulate and lanceolate, of the stem pinnately parted into 3 – 7 long and narrow divisions; flowers in a long and narrow interrupted panicle, nearly diœcious; corolla whitish, obconical (2″ long). — Wet plains and prairies, Ohio and Ont. to Iowa, Minn., and westward. June.

* * *Root fibrous; leaves thin.* (*Stems* 1 – 3° *high.*)

2. **V. sylvática**, Banks. Smooth or minutely pubescent; *root-leaves ovate or oblong, entire*, rarely with 2 small lobes; stem-leaves pinnate, with 3 – 11 oblong-ovate or lanceolate nearly entire leaflets; cyme at first close, many-flowered; *corolla inversely conical* (3″ long, rose-color or white). — Wet ground, Newf. to southern N. Y., N. Mich., westward and northward. June.

3. **V. pauciflòra**, Michx. Smooth, slender, surculose; *root-leaves ovate, heart-shaped, toothed*, pointed, sometimes with 2 small lateral divisions; stem-leaves pinnate, with 3 – 7 ovate toothed leaflets; branches of the panicled cyme few-flowered; tube of the (pale pink) *corolla long and slender* (½′ long). — Woods and alluvial banks, Penn. to S. Ill., Mo., and Tenn. June.

### 2. VALERIANÉLLA, Tourn. CORN SALAD. LAMB-LETTUCE.

Limb of the calyx obsolete or merely toothed. Corolla funnel-form, equally or unequally 5-lobed. Stamens 3, rarely 2. Fruit 3-celled, two of the cells empty and sometimes confluent into one, the other 1-seeded. — Annuals and biennials, usually smooth, with forking stems, tender and rather succulent leaves (entire or cut-lobed towards the base), and white or whitish cymose-clustered and bracted small flowers. — Our species all have the limb of the calyx obsolete, and are so much alike in aspect, flowers, etc., that good characters are only to be taken from the fruit. They all have a rather short corolla, the limb of which is nearly regular. (Name a diminutive of Valeriana.)

* *Corolla bluish: fruit with a corky mass at the back of the fertile cell.*

**V.** OLITÒRIA, Poll. Fruit flattish, obliquely rhomboidal; empty cells as large as the fertile, contiguous, the thin partition at length breaking up. — Old fields, N. Y. to Penn. and La. (Nat. from Eu.)

* * *Corolla white; no corky mass behind the fertile cell.*

+ *Fertile cell broader than the empty ones; cross-section of fruit triangular.*

1. **V. chenopodifòlia,** DC. Stems with long internodes and few forks; glomerate cymes few, slender-peduncled; bracts broadly lanceolate; fruit glabrous or pubescent, 2″ long. (Fedia Fagopyrum, *Torr. & Gray.*) — Moist grounds, western N. Y. to Minn., south to Va. and Ky.

+ + *Fertile cell as broad as the empty ones, beaked; cross-section quadrate.*

2. **V. radiàta,** Dufr. Fruit ovate-tetragonal, *downy-pubescent* (sometimes glabrous); empty cells as thick as the oblong-ovate fertile one, or thicker, *a broad shallow groove between them.* (Fedia radiata, *Michx.*) — Low grounds, Penn. to Minn., Tex., and Fla.

3. **V. stenocárpa,** Krok. Fruit oblong-tetragonal, *commonly glabrous;* oblong fertile cell thicker than the linear-oblong approximate empty ones. (Fedia stenocarpa, *Engelm.*) — W. Mo. and E. Kan. to Tex.

+ + + *Fertile cell much the narrowest, dorsally 1-nerved; section roundish.*

4. **V. Woodsiàna,** Walp. Fruit 1″ long or more; fertile cell ovate, tipped with a tooth; empty ones inflated, with oblong depression (sometimes an open cavity) in the middle. — Moist grounds, N. Y. and Penn. to Tex.

Var. **umbilicàta,** Gray. Empty cells becoming confluent, vesicular by incurvation of the circular margin, forming a deep and round umbilication. (Fedia umbilicata, *Sulliv.*) — N. Y. to Ohio and southward.

Var. **patellària,** Gray. Fruit saucer-shaped, emarginate at base and apex, winged by the divergent cells. (Fedia patellaria, *Sulliv.*) — Same range.

## ORDER 54. DIPSÀCEÆ. (TEASEL FAMILY.)

*Herbs, with opposite or whorled leaves, no stipules, and the flowers in dense heads, surrounded by an involucre, as in the* Composite Family; *but the stamens are distinct, and the suspended seed has albumen.* — Represented by the following introduced species and by the cultivated Sweet Scabious (*Scabiosa atropurpurea*).

### 1. DÍPSACUS, Tourn. TEASEL.

Involucre many-leaved, longer than the chaffy leafy-tipped and pointed bracts among the densely capitate flowers; each flower with a 4-leaved calyx-like involucel investing the ovary and fruit (achene). Calyx-tube coherent with the ovary, the limb cup-shaped, without a pappus. Corolla nearly regular, 4-cleft. Stamens 4, inserted on the corolla. Style slender. — Stout and coarse biennials, hairy or prickly, with large oblong heads. (Name from διψάω, *to thirst*, probably because the united cup-shaped bases of the leaves in some species hold water.)

1. **D.** sylvéstris, Mill. (Wild Teasel.) Prickly; leaves lance-oblong; leaves of the involucre slender, longer than the head; bracts (chaff) tapering into a long flexible awn with a straight point. — Roadsides; rather rare. (Nat. from Eu.) Suspected to be the original of

2. **D.** fullònum, L., the Fuller's Teasel, which has a shorter involucre, and stiff chaff to the heads, with hooked points, used for raising a nap upon woollen cloth; it has escaped from cultivation in some places. (Adv. from Eu.)

## Order 55. COMPÓSITÆ. (Composite Family.)

*Flowers in a close head* (the compound flower of the older botanists), *on a common receptacle, surrounded by an involucre, with* 5 (*rarely* 4) *stamens inserted on the corolla, their anthers united in a tube* (*syngenesious*). — Calyx-tube united with the 1-celled ovary, the limb (called a *pappus*) crowning its summit in the form of bristles, awns, scales, teeth, etc., or cup-shaped, or else entirely absent. Corolla either strap-shaped or tubular; in the latter chiefly 5-lobed, valvate in the bud, the veins bordering the margins of the lobes. Style 2-cleft at the apex (in sterile flowers usually entire). Fruit seed-like (*achene*), dry, containing a single erect anatropous seed, with no albumen. — An immense family, in temperate regions chiefly herbs, without stipules, with perfect, polygamous, monœcious or diœcious flowers. The flowers with a strap-shaped (*ligulate*) corolla are called *rays* or *ray-flowers;* the head which presents such flowers, either throughout or at the margin, is *radiate.* The tubular flowers compose the *disk;* and a head which has no ray-flowers is said to be *discoid.* When the head contains two sorts of flowers it is said to be *heterogamous;* when only one sort, *homogamous.* The leaves of the involucre, of whatever form or texture, are termed *scales.* The bracts or scales, which often grow on the receptacle among the flowers, are called the *chaff;* when these are wanting, the receptacle is said to be *naked.* — The largest order of Phænogamous plants. The genera are divided by the corolla into three series, only two of which are represented in the Northern United States. The first is much the larger.

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### Systematic Synopsis.

### Series I. TUBULIFLORÆ.

Corolla tubular in all the perfect flowers, regularly 5- (rarely 3 - 4-) lobed, ligulate only in the marginal or ray-flowers, which when present are either pistillate only, or neutral (with neither stamens nor pistil).

**Tribe I. VERNONIACEÆ.** Heads discoid; the flowers all alike, perfect and tubular, never yellow. Branches of the style long and slender, terete, thread-shaped, minutely bristly-hairy all over. — Leaves alternate or scattered.

1. **Elephantopus.** Heads 3 - 5-flowered, several crowded together into a compound head. Involucre of 8 scales. Pappus of several chaffy bristles.
2. **Vernonia.** Heads several - many-flowered, separate. Involucre of many scales. Pappus double, the inner capillary, the outer of minute chaffy bristles.

**Tribe II. EUPATORIACEÆ.** Heads discoid, the flowers all alike, perfect and tubular, never yellow. Branches of the style thickened upward or club-shaped, obtuse, very minutely and uniformly pubescent; the stigmatic lines indistinct.

* Pappus a row of hard scales.

3. **Sclerolepis.** Head many-flowered. Scales of the involucre equal. Leaves whorled.

* * Pappus of slender bristles.

+ Achene 5-angled; bristles of the pappus roughish.

4. **Mikania.** Flowers and involucral scales only 4. Stems twining.
5. **Eupatorium.** Involucre of more than 4 scales and the flowers few or many. Stems not twining.

+ + Achene 10-ribbed; involucral scales striate-nerved.

6. **Kuhnia.** Pappus very strongly plumose. Scales of the involucre few.
7. **Brickellia.** Involucral scales in several series. Pappus merely scabrous.
8. **Liatris.** Pappus plumose or only barbellate. Corolla red-purple, strongly 5-lobed. Heads spicate or racemose, the involucre well imbricated.
9. **Trilisa.** Pappus minutely barbellate. Corolla rose-purple. Heads corymbed or panicled, the involucre little imbricated.

**Tribe III. ASTEROIDEÆ.** Heads discoid, the flowers all alike and tubular; or else radiate, the outer ones ligulate and pistillate. Anthers not caudate at base. Branches of the style in the perfect flowers flat, smooth up to where the conspicuous marginal stigmatic lines abruptly terminate, and prolonged above this into a flattened lance-shaped or triangular appendage which is evenly hairy or pubescent outside. — Leaves alternate. Receptacle naked (destitute of chaff) in all our species.

* 1. Ray-flowers yellow (in one species of Solidago whitish), or sometimes none at all.

+ Pappus of not numerous slender bristles. Heads radiate. Involucre of firm scales with greenish tips, commonly coated with resin. West of the Mississippi.

10. **Gutierrezia.** Heads small, numerous. Ray and disk-flowers 3 or 4 each, all fertile. Pappus of several short chaffy scales. Suffrutescent; leaves very narrow.
11. **Amphiachyris.** Heads small. Ray-flowers 5–10; pappus coroniform. Disk-flowers infertile; pappus of several bristle-like scales. Annual; leaves very narrow.
12. **Grindelia.** Heads large, many-flowered. Flowers all fertile. Pappus of 2-8 rigid caducous awns. Coarse herbs with toothed leaves.

+ + Pappus (at least of the disk) of copious slender or capillary bristles.

= Pappus double.

13. **Heterotheca.** Resembling Chrysopsis, but the achenes of the ray thicker than those of the disk and without pappus or nearly so. Western.
14. **Chrysopsis.** Heads many-flowered; rays numerous. The outer pappus of very small chaffy bristles, much shorter than the inner of copious capillary bristles.

= = Pappus simple.

15. **Aplopappus.** Heads many-flowered, many-radiate. Involucre hemispherical. Pappus of many unequal bristles. Western.
16. **Bigelovia.** Heads 3-4-flowered; rays none. Receptacle awl-shaped. Pappus a single row of capillary bristles.
17. **Solidago.** Heads few-many-flowered; rays 1–16. Pappus of numerous slender and equal capillary bristles.
18. **Brachychæta.** Heads 8–10-flowered, clustered; rays 4 or 5. Pappus a row of minute bristles shorter than the achene.

* 2. Ray-flowers white, blue, or purple, never yellow.

+ Pappus none or very short, with or without a few awns.

++ Receptacle conical. Awns none.

19. **Bellis.** Achenes marginless, flattened; pappus none. Involucral scales equal.
20. **Aphanostephus.** Achenes prismatic; pappus coroniform. Outer scales shorter.

++ ++ Receptacle flat or convex. Pappus usually with awns.

21. **Chætopappa.** Achenes fusiform; pappus of 5 or fewer thin chaff and alternating awns. Western.

22. **Boltonia.** Achenes very flat, thick-winged; pappus of short bristles and usually 2–4 awns.

++ ++ Pappus of a single row of awns or coarse rigid bristles, or in the ray scale-like.

23. **Townsendia.** Low or stemless, with linear-spatulate leaves and large aster-like flowers.

++ ++ ++ Pappus of numerous long and capillary bristles; receptacle flat.

24. **Sericocarpus.** Heads 12–20-flowered; rays 4 or 5. Involucre oblong or club-shaped, imbricated, cartilaginous. Achenes short, narrowed downward, silky.

25. **Aster.** Heads many-flowered, on leafy peduncles. Involucral scales unequal, loosely or closely imbricated. Achenes flattish; pappus simple (rarely double), copious.

26. **Erigeron.** Heads many-flowered, on naked peduncles. Involucre of narrow equal scales, little imbricated. Achenes flattened; pappus simple and rather scanty, or with some outer minute scales.

* 3. Rays none. Heads diœcious (all pistillate or all staminate).

27. **Baccharis.** Heads many-flowered. Pappus capillary. Smooth glutinous shrubs.

**Tribe IV. INULOIDEÆ.** Heads discoid (radiate only in Inula), the pistillate flowers mostly filiform and truncate. Anthers sagittate, the basal lobes attenuate into tails. Style-branches with unappendaged obtuse or truncate naked tips. Pappus capillary or none.

* 1. Receptacle naked. Involucre not scarious, imbricated. Not woolly.

28. **Pluchea.** Heads containing a few perfect but sterile flowers in the centre, and many pistillate fertile ones around them. Pappus capillary.

* 2. Receptacle chaffy. Involucral scales few, mostly scarious. Low floccose-woolly annuals; flowers as in n. 28.

29. **Evax.** Receptacle convex. Achenes obcompressed. Pappus none. Western.

30. **Filago.** Receptacle subulate. Achenes terete. Outer flowers without pappus.

* 3. Receptacle naked. Involucral scales many, scarious. Floccose-woolly herbs.

31. **Antennaria.** Heads diœcious. Pappus of sterile flowers club-shaped, of the fertile united at base and deciduous together.

32. **Anaphalis.** Heads diœcious or nearly so. Pappus not thickened above nor at all united at base.

33. **Gnaphalium.** Heads all fertile throughout. Pappus all capillary.

* 4. Corollas all somewhat broadly tubular and lobed. Involucre not scarious. Receptacle naked. Pappus none.

34. **Adenocaulon.** Head few-flowered and scales few; outer flowers pistillate. Somewhat woolly.

* 5. Heads radiate. Receptacle naked. Involucre herbaceous. Pappus copious.

35. **Inula.** Heads large, many-flowered. Flowers yellow. Stout perennial.

**Tribe V. HELIANTHOIDEÆ.** Heads radiate or discoid. Involucre not scarious (nut-like in fruit in n. 43, 44). Receptacle chaffy. Pappus never capillary, sometimes none. Anthers not caudate. Style-branches truncate or hairy-appendaged.

* 1. Heads radiate (obscurely so in n. 41, sometimes discoid in n. 36), the ray pistillate and fertile, the disk perfect but sterile.

++ Achenes turgid, triangular-obovoid; pappus none.

36. **Polymnia.** Involucral scales in 2 rows, the 5 outer leaf-like, the inner small.

++ ++ Achenes flattened dorsally (obcompressed).

37. **Silphium.** Achenes wing-margined, in several rows; pappus none or 2 teeth. Scales thick, in several rows.

38. **Berlandiera.** Achenes wingless, 5 - 12 in one row, without pappus. Inner involucral scales obovate, outer smaller and more foliaceous. Western.
39. **Chrysogonum.** Achenes wingless, about 5; pappus a one-sided 2 - 3-toothed crown. Inner scales 5, chaff-like, the 5 outer longer and leaf-like.
40. **Engelmannia.** Achenes wingless, 8 - 10; pappus a scarious hispid crown. Outer scales (about 10) leaf-like, inner coriaceous with green tips. Western.
41. **Parthenium.** Rays 5, very short, persistent. Pappus of 2 small scales. Involucral scales short, roundish, in 2 rows.

* 2. Fertile flowers 1 - 5, the corolla none or reduced to a tube; staminate corolla funnel-form. Pappus none.

+ Heads with 1 - 5 pistillate flowers. Receptacle chaffy.

42. **Iva.** Achenes short, thick. Involucre of few roundish scales.

+ + Heads of two sorts on the same plant, the upper staminate with an open cup-shaped involucre, the lower pistillate, of 1 - 4 flowers in a closed bur-like involucre.

43. **Ambrosia.** Scales of staminate involucre united. Fruit 1-seeded.
44. **Xanthium.** Scales of staminate involucre distinct. Fruit 1 - 4-celled, 1 - 4-beaked.

* 3. Heads radiate, or rarely discoid; disk-flowers all perfect and fertile. Anthers blackish. Pappus none, or a crown or cup, or of one or two chaffy awns, never capillary, nor of several uniform chaffy scales. — Leaves more commonly opposite.

+ Involucre double; the outer forming a cup.

45. **Tetragonotheca.** Outer involucre 4-leaved. Achenes obovoid; pappus none.

+ + Involucre of one or more rows of separate scales.

++ Chaff of the flat receptacle bristle-shaped.

46. **Eclipta.** Ray short. Involucral scales 10 - 12, in two rows, herbaceous.

++ ++ Chaff scale-like, embracing or subtending the achenes.

= Receptacle high, conical or columnar in fruit. Pappus none or a short crown.

47. **Heliopsis.** Rays fertile. Achenes 4-sided. Leaves opposite.
48. **Echinacea.** Rays rose-colored, pistillate, sterile. Achenes short, 4-sided. Chaff spinescent.
49. **Rudbeckia.** Rays neutral. Achenes 4-sided, flat at the top, marginless.
50. **Lepachys.** Rays few, neutral. Achenes flattened laterally and margined.

= = Receptacle flat to convex. Achenes not winged nor very flat.

51. **Borrichia.** Achenes 3 - 4-angled; pappus a short 4-toothed crown. Shrubby.
52. **Helianthus.** Achenes flattened, bearing 2 very deciduous chaffy pointed scales.

= = = Receptacle convex (rarely conical). Achenes flat-compressed laterally, winged or wingless, 2-awned. Leaves decurrent.

53. **Verbesina.** Involucral scales closely imbricated in 2 or more rows.
54. **Actinomeris.** Scales few, soon deflexed. Achenes obovate, squarrosely spreading.

* 4. Rays few, neutral, or wanting. Achenes obcompressed, i. e., flattened parallel with the scales of the involucre (rarely terete). Involucre double; the outer spreading and often foliaceous. Receptacle flat. Leaves opposite.

55. **Coreopsis.** Pappus of 2 (or rarely more) scales, teeth, or awns, which are naked or barbed upward, sometimes obsolete or a mere crown.
56. **Bidens.** Pappus of 2 or more rigid and persistent downwardly barbed awns or teeth.
57. **Thelesperma.** Inner involucre connate to the middle. Achenes terete. Awns retrorsely bearded.

* 5. Heads radiate or discoid; disk-flowers all perfect and fertile. Achenes turbinate, 5-angled; pappus of several chaffy scales.

+ Leaves alternate, entire. Disk-flowers purplish.

58. **Baldwinia.** Rays numerous, long, neutral. Involucre much imbricated. Receptacle deeply honey-combed.
59. **Marshallia.** Rays none. Involucre of narrow leafy equal scales. Receptacle chaffy.

+ + Leaves opposite, serrate. Disk-flowers yellow.

60. **Galinsoga.** Rays few, short, pistillate, whitish. Involucre of 4–5 thin ovate scales. Receptacle chaffy.

**Tribe VI. HELENIOIDEÆ.** Nearly as Tribe V., but receptacle not chaffy (somewhat so in n. 64). In our genera, the disk-flowers perfect and fertile; the pappus a row of several chaffy scales (bristly-dissected in n. 65); the involucre hardly at all imbricated (partly scarious in n. 61).

* Involucral scales distinct, not glandular-punctate.

61. **Hymenopappus.** Rays none. Receptacle flat. Involucre colored. Western.
62. **Actinella.** Rays fertile, 3-toothed. Receptacle elevated. Involucre appressed. Western.
63 **Helenium.** Rays fertile or sterile, 3–5-cleft. Receptacle elevated. Involucre small, reflexed. Leaves decurrent.
64. **Gaillardia.** Ray 3-toothed, or none. Receptacle usually beset with fine fimbrillate chaff. Outer involucral scales loose and leafy. Pappus-chaff tipped with the projecting midvein. Western.

* * Dotted with oil-glands. Involucral scales united into a cup.

65. **Dysodia.** Pappus a row of chaffy scales dissected into many bristles.

**Tribe VII. ANTHEMIDEÆ.** Distinguished from the last two tribes by the more or less dry and scarious imbricated scales of the involucre. Heads radiate (ray mostly white) or discoid, the perfect flowers sometimes sterile and the pistillate rarely tubular. Achenes small; pappus a short crown or none. — Mostly strong-scented; leaves alternate.

* Receptacle chaffy, at least in part. Heads radiate, many-flowered.

66. **Anthemis.** Achenes terete, angled or ribbed. Heads hemispherical, rather large.
67. **Achillea.** Achenes obcompressed. Heads small, campanulate or obovate.

* * Receptacle naked.

+ Heads rather large, pedunculate, radiate or rarely rayless.

68. **Matricaria.** Receptacle conical. Rays pistillate or none. Pappus crown-like or none.
69. **Chrysanthemum.** Receptacle flattish. Rays many, pistillate. Pappus none.

+ + Heads mostly small, discoid, corymbed or paniculate.

70 **Tanacetum.** Heads corymbed. Achene with broad summit; pappus a short crown.
71. **Artemisia.** Heads in panicled spikes or racemes. Achenes with narrow summit; pappus none.

**Tribe VIII. SENECIONIDEÆ.** Heads radiate or discoid, the involucre little or not at all imbricated, not scarious. Receptacle naked. Anthers tailless. Pappus capillary.

* Heads monœcious or subdiœcious, the perfect flowers mostly sterile, and the small (ligulate or tubular) ray-flowers in more than one row (at least in the fertile heads). Style-branches obtuse, not appendaged nor hispid. Leaves all radical.

72. **Tussilago.** Head solitary, yellow-flowered, monœcious.
73. **Petasites.** Heads corymbed, subdiœcious. Flowers white or purplish.

* * Flowers all fertile. Style-branches truncate or capitellate, often appendaged. Involucral scales connivent-erect.

+ Leaves opposite.

74. **Arnica.** Heads showy. Pappus rather rigid, scabrous.

+ + Leaves alternate. Pappus soft-capillary, copious.

75. **Senecio.** Heads usually radiate. Corollas yellow, 5-toothed.
76. **Cacalia.** Heads discoid. Corollas white or cream-colored, 5-cleft.
77. **Erechtites.** Heads discoid. Flowers whitish, the outer pistillate with filiform corollas.

**Tribe IX. CYNAROIDEÆ.** Flowers all tubular and perfect (the outer ray-like and neutral in n. 82). Involucre much imbricated. Anthers caudate, long-appendaged at tip. Style-branches short or united, obtuse, unappendaged, smooth, with often a pubescent ring below. Pappus mostly bristly. — Leaves alternate.

* Achenes attached by the base. Flowers all alike.

+ Leaves not prickly. Style-branches partly distinct. Filaments glabrous.

78. **Arctium.** Involucral scales hooked at the tip. Pappus of short rough bristles.

+ + Leaves prickly. Style-branches coherent, usually a pubescent ring below.

79. **Cnicus.** Pappus-bristles plumose. Receptacle densely bristly.
80. **Carduus.** Pappus-bristles not plumose. Receptacle densely bristly.
81. **Onopordon.** Pappus-bristles not plumose. Receptacle deeply honeycombed.

* * Achenes attached obliquely. Marginal flowers often enlarged and ray-like.

82. **Centaurea.** Involucral scales appendaged. Pappus double and bristly, or very short or none.

## SERIES II. LIGULIFLORÆ. Tribe X. CICHORIACEÆ.

Corolla ligulate in all the flowers of the head, and all the flowers perfect. — Herbs, with milky juice. Leaves alternate.

* Pappus none.

83. **Lampsana.** Involucre cylindrical, of 8 scales in a single row, 8–12-flowered.

* * Pappus chaffy, or of both chaff and bristles.

84. **Krigia.** Involucre simple, not calyculate. Pappus of both chaff and bristles.
85. **Cichorium.** Involucre double. Pappus a small crown of many bristle-form scales.

* * * Pappus plumose.

86. **Tragopogon.** Involucre simple, not calyculate. Achenes long-beaked. Stems leafy
87. **Leontodon.** Involucre calyculate. Achenes fusiform. Leaves radical.
88. **Picris.** Outer involucral scales spreading. Achenes terete. Stems leafy.

* * * * Pappus composed entirely of capillary bristles, not plumose.

+ Achenes not flattened, columnar or terete, often slender.

++ Achenes not beaked.

= Flowers yellow or orange.

89. **Hieracium.** Involucre imbricated. Pappus tawny. Pilose perennials.
90. **Crepis.** Involucral scales in one row. Pappus white, soft. Not pilose.

= = Flowers white or cream-color or pinkish. Involucre calyculate.

91. **Prenanthes.** Achenes short, blunt. Pappus tawny or brown. Stems leafy and heads often nodding.
92. **Lygodesmia.** Achenes long, tapering. Pappus white. Stems nearly leafless; heads erect. Western.

++ ++ Achenes beaked (sometimes beakless in n. 93). Flowers yellow.

93. **Troximon.** Scapose. Involucre loosely imbricated. Achenes 10-ribbed.
94. **Taraxacum.** Scapose. Involucre calyculate. Achenes 4–5-ribbed.
95. **Pyrrhopappus.** Scapose or branched. Pappus reddish, the base surrounded by a soft villous ring.
96. **Chondrilla.** Stem branching, leafy. Involucre few-flowered, calyculate. Pappus white.

+ + Achenes flat or flattish. Pappus white, fine and soft. Involucre imbricated. Leafy-stemmed, with panicled heads.

97. **Lactuca.** Achenes more or less beaked. Flowers yellow or purplish.
98. **Sonchus.** Achenes flattish, not at all beaked. Flowers yellow.

The technical characters of the tribes, taken from the styles, require a magnifying-glass to make them out, and will not always be clear to the student. The following artificial analysis, founded upon other and more obvious distinctions, will be useful to the beginner.

## Artificial Key to the Genera of the Tubulifloræ.

### § 1. Rays or ligulate flowers none; corollas all tubular (or rarely none).

#### * 1. Flowers of the head all perfect and alike.

- Pappus composed of bristles:
  - Double, the outer of very short, the inner of longer bristles . . . . . . No. 2
  - Simple, the bristles all of the same sort.
    - Heads few-flowered, themselves aggregated into a compound or dense cluster . . 1
    - Heads separate, few-flowered or many-flowered.
      - Receptacle (when the flowers are pulled off) bristly-hairy . . . . . 78, 79, 80
      - Receptacle deeply honeycomb-like . . . . . . . . . . . . . 81
      - Receptacle naked.
        - Pappus of plumose or bearded stiff bristles. Flowers purple . . . . . 8
        - Pappus of very plumose bristles. Flowers whitish . . . . . . . 6
        - Pappus of slender but rather stiff rough bristles . . . . . 4, 5, 7, 9, 16
        - Pappus of very soft and weak naked bristles . . . . . . . . 76, 77
- Pappus composed of scales or chaff.
  - Receptacle naked. Leaves in whorls . . . . . . . . . . . . . 3
  - Receptacle naked. Leaves alternate, dissected . . . . . . . . . . 61
  - Receptacle bearing chaff among the flowers . . . . . . . . . . . 59, 64
- Pappus of 2 or few awns or teeth . . . . . . . . . . 12, 53, 57, barbed in 55, 56
- Pappus none, or a mere crown-like margin to the fruit . . . . . . . . 36, 68, 71

#### * 2. Flowers of two kinds in the same head.

- Marginal flowers neutral and sterile, either conspicuous or inconspicuous . . . 82
- Marginal flowers pistillate and fertile.
  - Receptacle elongated and bearing broad chaff among the flowers . . . . . 29, 30
  - Receptacle convex, chaffy. Achene flat, 2-awned . . . . . . . . . . 52
  - Receptacle naked or bearing no conspicuous chaff.
    - Pappus of capillary bristles. Involucre imbricated . . . . . . . 28, 32, 33
    - Pappus of capillary bristles. Involucre merely one row of scales . . . 26, 73, 77
    - Pappus a short crown or none.
      - Achenes becoming much longer than the involucre . . . . . . . . . 34
      - Achenes not exceeding the involucre . . . . . . . . . . . 42, 70, 71

#### * 3. Flowers of two kinds in separate heads, the one pistillate, the other staminate.

- Heads diœcious; in both kinds many-flowered. Pappus capillary . . . 27, 31, 32, 79
- Heads monœcious; the fertile 1-2-flowered and closed. Pappus none . . . 43, 44

### § 2. Rays present; i. e. the marginal flowers or some of them with ligulate corollas.

#### * 1. Pappus of capillary bristles, at least in the disk. (Rays all pistillate.)

- Rays occupying several rows . . . . . . . . . . . . . . . 26, 72, 73
- Rays in one marginal row, and
  - White, purple or blue, never yellow . . . . . . . 17, 24, 25, 26, 73
  - Yellow, of the same color as the disk.
    - Pappus (at least in the disk) double, the outer short and minute . . . 13, 14
    - Pappus simple.
      - Scales of the involucre equal and all in one row. Leaves alternate . . . 75
      - Scales of the involucre in two rows. Leaves opposite . . . . . . . 74
      - Scales of the involucre imbricated. Leaves alternate . . . 10, 11, 15, 17, 35

#### * 2. Pappus a circle of awns or rigid bristles (at least in the disk).

- Ray yellow, awns few (2-8) . . . . . . . . . . . . . . . . 12
- Ray rose-color . . . . . . . . . . . . . . . . . . . 23

* 3. Pappus a circle of chaffy scales, dissected into bristles . . . 65

* 4. Pappus a circle of thin chaffy scales or short chaffy bristles.

Heads several-flowered. Receptacle chaffy . . . . . . . . . . . 60
Heads 8–10-flowered. Receptacle naked . . . . . . . . . . . 18
Heads many-flowered. Receptacle deeply honeycombed . . . . . . . . . 58
Heads many-flowered. Receptacle naked . . . . . . . . . . 62, 63
Heads many-flowered. Receptacle chaffy . . . . . . . . . . . . 64

* 5. Pappus none, or a cup or crown, or of 2 or 3 awns, teeth, or chaffy scales corresponding with the edges or angles of the achene, often with intervening minute bristles or scales.

+– Receptacle naked.

Achene flat, wing-margined. Pappus of separate little bristles and usually 2–4 awns . 22
Achene flat, marginless. Pappus none. Receptacle conical . . . . . . 19
Achene terete or angled. Pappus none. Receptacle flattish . . . . . . . . 69
Achene angled. Pappus a little cup or crown (or none). Receptacle conical . . 20, 68
Achene fusiform. Pappus of few scales, usually with alternating awns . . . . . 21

+– +– Receptacle chaffy.

Rays neutral (rarely pistillate but sterile); the disk-flowers perfect and fertile.
  Receptacle mostly elevated (varying from convex to columnar), and
    Chaffy only at the summit; the chaff deciduous. Pappus none . . . . . 66
    Chaffy throughout. Achene flattened laterally if at all . . . 48, 49, 50, 52, 54
  Receptacle flat or flattish. Achene flattened parallel with the scales or chaff . 55, 56
  Receptacle flat. Achene terete, 2-awned . . . . . . . . . . . . 57
Rays pistillate and fertile; the disk-flowers also perfect and fertile.
  Achene much flattened laterally, 1–2-awned . . . . . . . . . . 53
  Achene flattened parallel with the scales and chaff. Pappus none . . . . . 67
  Achene 3–4-angular, terete or laterally flattish, awnless.
    Receptacle convex or conical. Leaves alternate, dissected . . . . . . 66
    Receptacle conical. Leaves opposite, simple.
      Achene obovoid. Involucre a leafy cup . . . . . . . . . . 45
      Achene 4-angular. Involucre of separate scales . . . . . . . . 47
    Receptacle flat. Leaves opposite and simple . . . . . . . . . 46, 51
Rays pistillate and fertile; the disk-flowers staminate and sterile (pistil imperfect).
    Receptacle chaffy . . . . . . . . . . . . . . . 36–41

## 1. ELEPHÁNTOPUS, L. Elephant's-foot.

Heads discoid, 2–5-flowered, several together clustered into a compound pedunculate head; flowers perfect. Involucre narrow, flattened, of 8 oblong dry scales. Achenes 10-ribbed; pappus of stout bristles, chaffy-dilated at the base. — Perennials, with alternate leaves and purplish flowers. (Name composed of ἔλεφας, *elephant*, and ποῦς, *foot.*)

* *Stem leafy; upper leaves very like the basal.*

1. **E. Caroliniànus,** Willd. Somewhat hairy, corymbose, leafy; leaves ovate-oblong, thin. — Dry soil, Penn. to Ill. and Kan., and southward.

* * *Stem scape-like, with a few bract-like leaves or naked.*

2. **E. tomentòsus,** L. Somewhat hairy; basal leaves obovate to narrowly spatulate, silky and prominently veined beneath; heads large; pappus-scales attenuate. — Va., Ky., and southward.

3. **E. nudàtus,** Gray. Strigose-puberulent; basal leaves thin, green, spatulate-obovate or oblanceolate, not prominently veined beneath; heads smaller; pappus-scales broadly deltoid. — Del. and southward.

### 2. VERNÒNIA, Schreb. Iron-weed.

Heads discoid, 15 – many-flowered, in corymbose cymes; flowers perfect. Involucre shorter than the flowers, of many much imbricated scales. Receptacle naked. Achenes cylindrical, ribbed; pappus double, the outer of minute scale-like bristles, the inner of copious capillary bristles. — Perennial herbs, with leafy stems, alternate and acuminate or very acute leaves and mostly purple flowers. Species very difficult. (Named for *Wm. Vernon*, an early English botanist who travelled in this country.)

* *Heads large,* 50 – 70-*flowered.*

1. **V. Arkansàna,** DC. Tall, rather glabrous; leaves linear-lanceolate, retrorsely denticulate; involucre very squarrose, the scales with long filiform tips. — Mo., Kan., and southward.

* * *Heads* ½′ *high or less,* 15 – 40-*flowered.*

+– *Leaves narrowly linear, glabrous, veinless, mostly entire.*

2. **V. Jamèsii,** Torr. & Gray. Low, nearly glabrous; heads few-flowered; scales obtuse or acute. — Plains of Neb. and southward.

+– +– *Leaves broader, mostly sharply denticulate or rigidly serrate, veined.*

3. **V. fasciculàta,** Michx. Leaves linear to oblong-lanceolate; heads many, crowded; scales close, obtuse or the uppermost mucronate; achene smooth. — Low grounds, Ohio and Ky. to Dak., and southward. Aug.

4. **V. altíssima,** Nutt. Usually tall; leaves lanceolate or lance-oblong; cyme loose; scales close, obtuse or mucronate; achenes hispidulous on the ribs. — Low grounds, W. Penn. to Ill., and southward. — Heads variable, 2 – 4″ high and the scales in few or many ranks; the var. GRANDIFLÒRA, Nutt., with large heads, the involucre of 35 – 40 scales in many ranks.

5. **V. Noveboracénsis,** Willd. Rather tall; leaves long-lanceolate to lance-oblong; cyme open; involucre usually purplish; scales ovate and lance-ovate tipped with a slender cusp or awn. — Low grounds near the coast, Maine to Va., west to Minn., E. Kan., and southward. Aug.

Var. **latifòlia,** Gray. Leaves broader; heads few; scales merely acute or acuminate. — Penn. to Ohio and southward.

6. **V. Baldwínii,** Torr. Tomentulose; heads small, at first globose; leaves lance-oblong or -ovate; involucre hoary-tomentose, greenish, squarrose, the scales acute or acuminate. — Prairies and barren hills; E. Mo. to Kan. and Tex. July, Aug. Passes into n. 4.

### 3. SCLERÓLEPIS, Cass.

Head discoid, many-flowered; flowers perfect. Involucral scales linear, equal, in 1 or 2 rows. Receptacle naked. Corolla 5-toothed. Achenes 5-angled; pappus a single row of 5 almost horny oval and obtuse scales. — A smooth perennial, with simple stems, rooting at the base, linear entire leaves in whorls of 4 – 6, and a terminal head of flesh-colored flowers. (Name composed of σκληρός, *hard,* and λεπίς, *a scale,* from the pappus.)

1. **S. verticillàta,** Cass. — In water; pine barrens, New Jersey and southward. Aug.

### 4. MIKÀNIA, Willd. CLIMBING HEMP-WEED.

Heads discoid, 4-flowered. Involucre of 4 scales. Receptacle small. Flowers, achenes, etc., as in Eupatorium. — Twining perennials, climbing bushes, with opposite commonly heart-shaped and petioled leaves, and corymbose-panicled flesh-colored flowers. (Named for *Prof. Mikan*, of Prague.)

1. **M. scándens,** L. Nearly smooth, twining: leaves somewhat triangular-heart-shaped or halberd-form, pointed, toothed at the base. — Copses along streams, E. New Eng. to Ky., and southward. July – Sept.

### 5. EUPATÒRIUM, Tourn. THOROUGHWORT.

Heads discoid, 3 – many-flowered; flowers perfect. Involucre cylindrical or bell-shaped, of more than 4 scales. Receptacle flat or conical, naked. Corolla 5-toothed. Achenes 5-angled; pappus a single row of slender capillary barely roughish bristles. — Erect perennial herbs, often sprinkled with bitter resinous dots, with generally corymbose heads of white, bluish, or purple blossoms, appearing near the close of summer. (Dedicated to *Eupator Mithridates*, who is said to have used a species of the genus in medicine.)

§ 1. EUPATORIUM proper. *Receptacle flat.*

* *Heads cylindrical,* 5 – 15-*flowered; the purplish scales numerous, closely imbricated in several rows, of unequal length, slightly striate; stout herbs, with ample mostly whorled leaves, and flesh-colored flowers.*

1. **E. purpùreum,** L. (JOE-PYE WEED. TRUMPET-WEED.) Stems tall and stout, simple; leaves 3 – 6 in a whorl, oblong-ovate or lanceolate, pointed, very veiny, roughish, toothed; corymbs very dense and compound. — Varies greatly in size (2 – 12° high), etc., and with spotted or unspotted, often dotted stems, etc., — including several nominal species. — Low grounds; common.

Var. **amœnum,** Gray. Low; leaves fewer, ovate or oblong; heads few, 3 – 5-flowered. — Mountains of Va. and N. Y.

* * *Heads* 3 – 20-*flowered; involucre of* 8 – 15 *more or less imbricated and unequal scales, the outer ones shorter; flowers white.*

+ *Leaves all alternate, mostly dissected; heads panicled, very small,* 3 – 5-*flowered.*

2. **E. fœniculàceum,** Willd. (DOG-FENNEL.) Smooth or nearly so, paniculately much-branched (3 – 10° high); leaves 1 – 2-pinnately parted, filiform. — Va., near the coast, and southward. Adv. near Philadelphia.

+ + *Leaves long-petioled, the upper ones alternate; heads* 12 – 15-*flowered, in compound corymbs.*

3. **E. serótinum,** Michx. Stem pulverulent-pubescent, bushy-branched (3 – 7° high); leaves ovate-lanceolate, tapering to a point, triple-nerved and veiny, coarsely serrate (3 – 6′ long); involucre very pubescent. — Alluvial ground, Md. to Minn., E. Kan., and southward.

+ + + *Leaves sessile or nearly so, with a narrow base, mostly opposite; heads mostly* 5-*flowered.*

= *Involucral scales with white and scarious acute tips.*

4. **E. álbum,** L. *Roughish-hairy* (2° high), *leaves oblong-lanceolate, coarsely toothed, veiny;* heads clustered in the corymb; *involucral scales* close v

imbricated, rigid, narrowly lanceolate, *longer than the flowers.* — Sandy and barren places, pine barrens of Long Island to Va., and southward.

Var. **subvenòsum,** Gray. Less rough; leaves 1 – 2′ long, finely toothed and less veiny. — Long Island and N. J.

5. **E. leucólepis,** Torr. & Gray. Minutely pubescent, simple (1 – 2° high); *leaves linear-lanceolate, closely sessile, 1-nerved,* obtuse, *minutely serrate, rough both sides;* corymb hoary. — Sandy bogs, Long Island, N. J., and southward.

= = *Scales not scarious or obscurely so, obtuse, at length shorter than the flowers.*

6. **E. hyssopifòlium,** L. Minutely pubescent (1 – 2° high); *leaves narrow, linear or lanceolate,* elongated, obtuse, 1 – 3-nerved, entire, or the lower toothed, often crowded in the axils, *acute at the base.* — Sterile soil, Mass. to Va., E. Ky., and southward.

Var. **laciniàtum,** Gray. Leaves irregularly and coarsely toothed or laciniate. — Penn., Ky., and southward.

7. **E. semiserràtum,** DC. Minutely velvety-pubescent, branching (2 – 3° high), *leaves lanceolate or oblong, triple-ribbed and veiny,* serrate above the middle, *tapering to the base,* the lower slightly petioled; heads small. (E. parviflorum, *Ell.*) — Damp soil, Va. to Ark., and southward. — Leaves sometimes whorled in threes, or the upper alternate.

8. **E. altíssimum,** L. Stem stout and tall (3 – 7° high), *downy; leaves lanceolate, tapering at both ends, conspicuously 3-nerved,* entire, or toothed above the middle, the uppermost alternate; corymbs dense; *scales of the involucre obtuse,* shorter than the flowers. — Dry soil, Penn. to Minn. and Ky. — Leaves 3 – 4′ long, somewhat like those of a Solidago.

+ + + + *Leaves sessile or nearly so, with a broad base, opposite or in threes: heads pubescent.*

= *Heads* 5 – 8-*flowered; leaves not clasping.*

9. **E. teucrifòlium,** Willd. Roughish-pubescent (2 – 8° high); *leaves ovate-oblong and ovate-lanceolate,* obtuse or truncate at base, slightly triple-nerved, veiny, *coarsely toothed or incised toward the base, the lower shortly petioled, the upper alternate;* branches of the corymb few, unequal; *scales of the involucre oblong-lanceolate, at length shorter than the flowers.* — Low grounds, Mass. to Va., and southward near the coast.

10. **E. rotundifòlium,** L. Downy-pubescent (2° high); *leaves roundish-ovate, obtuse,* truncate or slightly heart-shaped at the base, deeply crenate-toothed, triple-nerved, veiny, roughish (1 – 2′ long); corymb large and dense; *scales of the* (5-*flowered*) *involucre linear-lanceolate,* slightly pointed. — Dry soil, R. I. to Va., near the coast, and southward

Var. **ovàtum,** Torr. Usually taller, leaves ovate, acute, hardly truncate at base, more strongly serrate; heads 5 – 8-flowered. (E. pubescens, *Muhl.*) — Mass. to Va., near the coast.

11. **E. sessilifòlium,** L. (Upland Boneset.) Stem tall (4 – 6° high), *smooth,* branching; *leaves oblong- or ovate-lanceolate, tapering from near the rounded sessile base to the sharp point,* serrate, veiny, smooth (3 – 6′ long); corymb very compound, pubescent; *scales of the 5-flowered involucre oval and oblong, obtuse.* — Copses and banks, Mass. to Ill., and southward along the mountains

= = *Leaves opposite, clasping or united at the base, long, widely spreading; heads mostly* 10 – 15-*flowered; corymbs very compound and large.*

12. **E. perfoliàtum,** L. (THOROUGHWORT. BONESET.) Stem stout (2 – 4° high), *hairy; leaves lanceolate, united at the base around the stem* (connate-perfoliate), tapering to a slender point, serrate, very veiny, wrinkled, downy beneath (5 – 8′ long); scales of the involucre linear-lanceolate. — Low grounds; common and well-known. — Varies with the heads 30 - 40-flowered, or with some or all of the leaves separated and truncate at base.

Var. **cuneàtum,** Engelm. Leaves smaller, narrowed at base and separate, and heads fewer-flowered. Perhaps a hybrid with n. 7. — Mo. and southward.

13. **E. resinòsum,** Torr. *Minutely velvety-downy* (2 – 3° high); *leaves linear-lanceolate, elongated,* serrate, *partly clasping,* tapering to the point, slightly veiny beneath (4 – 6′ long); scales of the involucre oval, obtuse. — Wet pine barrens, N. J. — Name from the copious resinous globules of the leaves.

* * * *Heads* 8 – 30-*flowered; involucral scales nearly equal, in one row; leaves opposite, ovate, petioled, triple-nerved, not resinous-dotted; flowers white.*

14. **E. ageratoìdes,** L. (WHITE SNAKE-ROOT.) Smooth, branching (3° high); *leaves broadly ovate, pointed, coarsely and sharply toothed, long-petioled,* thin (3 – 5′ long); corymbs compound. — Rich woods; common northward.

15. **E. aromáticum,** L. Smooth or slightly downy; stems nearly simple; *leaves on short petioles, ovate, rather obtusely toothed, not pointed,* thickish. — Copses, Mass. to Va., and southward, near the coast. — Lower and more slender than n. 14, with fewer, but usually larger heads; not aromatic.

§ 2. CONOCLÍNIUM. *Receptacle conical; involucral scales nearly equal, somewhat imbricated.*

16. **E. cœlestìnum,** L. (MIST-FLOWER.) Somewhat pubescent (1 – 2° high); leaves opposite, petiolate, triangular-ovate and slightly heart-shaped, coarsely and bluntly toothed; heads many-flowered, in compact cymes; flowers blue or violet. (Conoclinium cœlestinum, *DC.*) — Rich soil, N. J. to Mich., Ill., and southward. Sept.

## 6. KÙHNIA, L.

Heads discoid, 10 – 25-flowered; flowers perfect. Involucral scales thin, few and loosely imbricated, narrow, striate-nerved. Corolla slender, 5-toothed. Achenes cylindrical, 10-striate; pappus a single row of very plumose (white) bristles. — A perennial herb, resinous-dotted, with mostly alternate leaves, and paniculate-corymbose heads of cream-colored flowers. (Dedicated to *Dr. Kuhn,* of Pennsylvania, who carried the living plant to Linnæus.)

1. **K. eupatorioìdes,** L. Stems 2 – 3° high; pubescence minute; leaves varying from broadly lanceolate and toothed, to linear and entire. — Dry soil, N. J. to Minn., E. Kan., and southward. Sept. Very variable. — Var. CORYMBULÒSA, Torr. & Gray, is a western form, stouter and somewhat more pubescent, the heads rather crowded.

## 7. BRICKÉLLIA, Ell.

Characters as in Kuhnia; involucral scales more numerous, and the bristles of the pappus merely scabrous or at the most barbellate or subplumose; leaves often all opposite. (*Dr. John Brickell* of Georgia, correspondent of Elliott and Muhlenberg.)

1. **B. grandiflòra,** Nutt. Nearly glabrous, 2–3° high; leaves deltoid, cordate, the upper deltoid-lanceolate, coarsely dentate-serrate, acuminate, 4′ long or less; heads about 40-flowered.—Shannon Co., Mo. (*Bush*), Kan to Col., New Mex., and westward.

### 8. LIÀTRIS, Schreb. BUTTON SNAKEROOT. BLAZING-STAR.

Head discoid, few–many-flowered; flowers perfect. Involucral scales well imbricated, appressed. Receptacle naked. Corolla 5-lobed, the lobes long and slender. Achenes slender, tapering to the base, 10-ribbed. Pappus of 15–40 capillary bristles, manifestly plumose or only barbellate.—Perennial herbs, often resinous-dotted, with simple stems from a roundish corm or tuber, rigid alternate narrow entire leaves (sometimes twisted so as to become vertical), and spicate or racemed heads of handsome rose-purple flowers, appearing late in summer or in autumn. (Derivation of the name unknown.)

* *Pappus very plumose; scales of the 5-flowered involucre with ovate or lanceolate spreading petal-like (purple or sometimes white) tips, exceeding the flowers.*

1. **L. élegans,** Willd. Stem (2–3° high) and involucre hairy; leaves linear, short and spreading; spike or raceme compact (3–20′ long).—Barren soil, Va. and southward.

* * *Pappus very plumose; scales of the cylindrical many-flowered involucre imbricated in many rows, the tips rigid, not petal-like; corolla-lobes hairy within.*

2. **L. squarròsa,** Willd. (BLAZING-STAR, etc.) Often hairy (6′–2° high); leaves rigid, linear, elongated; heads usually few (1′ long); *scales mostly with elongated and leaf-like spreading tips.*—Dry soil, Penn. to Minn., and southward.—Var. INTERMÈDIA, DC. Heads narrow; scales shorter, erect or nearly so.—Ont. to Neb. and Tex.

3. **L. cylindràcea,** Michx. Commonly smooth (6–18′ high); leaves linear; *heads* few (½–⅔′ long); *scales with short and rounded abruptly mucronate appressed tips.*—Dry open places, Niagara Falls to Minn. and Mo.

* * * *Pappus very plumose; heads 4–6-flowered; scales acuminate; corolla-lobes naked.*

4. **L. punctàta,** Hook. Stout (10–30′ high), from a branching or globose rootstock; leaves narrowly linear or the upper acerose, rigid; heads usually many in a dense spike.—Minn to Kan., and southward.

* * * *Pappus not obviously plumose to the naked eye; corolla-lobes smooth inside.*

5. **L. scariòsa,** Willd. Stem stout (2–5° high), pubescent or hoary; *leaves* (smooth, rough, or pubescent) *lanceolate;* the lowest *oblong-lanceolate or obovate-oblong,* tapering into a petiole; heads few or many, large, 25–40-flowered; *scales of the broad or depressed involucre obovate or spatulate, very numerous, with dry and scarious often colored tips or margins.*—Dry soil, New Eng. to Minn., and southward.—Widely variable; heads 1′ or less in diameter.

6. **L. pycnostàchya,** Michx. Hairy or smoothish; stem stout (3–5° high), very leafy; leaves linear-lanceolate, the upper very narrowly linear; *spike thick and dense* (6–20′ long); heads about 5-flowered (½′ long); *scales*

*of the cylindrical involucre oblong or lanceolate, with recurved or spreading colored tips.* — Prairies, from Ind. to Minn., and southward.

7. **L. spicàta,** Willd. Smooth or somewhat hairy; stems very leafy, stout (2 – 5° high); leaves linear, the lower 3 – 5-nerved; heads 8 – 12-flowered (⅓ – ½′ long), crowded in a long spike; *scales of the cylindrical-bell-shaped involucre oblong or oval, obtuse, appressed, with slight margins; achenes pubescent or smoothish.* — Moist grounds; common from Mass. to Minn., and southward. — Involucre often resinous, very smooth.

Var. **montàna,** Gray. Low and stout; leaves broader, obtuse; spike short and heads large. — Mountain-tops, Va., and southward.

8. **L. graminifòlia,** Willd. Hairy or smoothish; stem (1 – 3° high) slender, leafy; leaves linear, elongated, 1-nerved; heads several or numerous, in a spike or raceme, 7 – 12-flowered; *scales of the obconical or obovoid involucre spatulate or oblong, obtuse, or somewhat pointed, rigid, appressed; achenes hairy.* — Va. and southward. — Inflorescence sometimes panicled, especially in

Var. **dùbia,** Gray. Scales of the involucre narrower and less rigid, oblong, often ciliate. — Wet pine barrens, N. J., and southward.

## 9. TRÍLISA, Cass.

Heads discoid, 5 – 10-flowered; flowers perfect. Involucral scales nearly equal, little imbricated. Receptacle naked. Corolla-lobes short-ovate or oblong. Achenes 10-ribbed; pappus of rather rigid bristles, not plumose. — Perennial herbs, fibrous-rooted, with broad entire leaves, obscurely or not at all punctate, and cymules of small heads in a thyrse or panicle. Flowers rose-purple, in autumn. (Name an anagram of *Liatris.*)

1. **T. odoratíssima,** Cass. (Vanilla-plant.) *Very smooth; leaves pale,* thickish, obovate-spatulate, or the upper oval and clasping; *heads corymbed.* (Liatris odoratissima, *Willd.*) — Low pine barrens, Va., and southward. — Leaves exhaling the odor of Vanilla when bruised.

2. **T. paniculàta,** Cass. *Viscid-hairy;* leaves narrowly oblong or lanceolate, smoothish, those of the stem partly clasping, *heads panicled.* (Liatris paniculata, *Willd.*) — Va. and southward.

## 10. GUTIERRÈZIA, Lag.

Heads few – several-flowered, radiate; rays 1 – 6, pistillate. Involucre oblong-clavate; scales coriaceous with green tips, closely imbricated, the outer shorter. Receptacle small, naked. Achenes short, terete; pappus of about 9 chaffy scales, shorter in the ray-flowers. — Suffrutescent (our species), glabrous and often glutinous, much branched, with narrowly linear entire alternate leaves, and small heads of yellow flowers in fastigiate or paniculate cymes. (From *Gutierrez,* a noble Spanish family.)

1. **G. Euthámiæ,** Torr. & Gray. Low; leaves numerous, 1 – 2′ long; heads usually crowded, the disk- and short ray-flowers usually 3 or 4 each. — Dry plains, Mont. and Minn. to central Kan., southward and westward.

## 11. AMPHIÁCHYRIS, Nutt.

Heads hemispherical; rays 5 – 10. Disk-flowers perfect but infertile. Pappus of the ray minute, coroniform; of the disk-flowers of almost bristle-like scales, more or less dilated and united at base. — A diffusely much-branched annual, with heads solitary on the branchlets; otherwise as Gutierrezia. (From ἀμφί, *around*, and ἄχυρον, *chaff*.)

1. **A. dracunculoìdes,** Nutt. Rather low, slender; leaves narrowly linear, the upper filiform; disk-flowers 10–20, their pappus of 5–8 bristle-like chaff united at base and slightly dilated upward. — Plains, Kan. and southward.

## 12. GRINDÈLIA, Willd.

Heads many-flowered, radiate (or rayless); ray pistillate. Scales of the hemispherical involucre imbricated in several series, with slender more or less spreading green tips. Achenes short and thick, compressed or turgid, truncate, glabrous; pappus of 2–8 caducous awns. Coarse perennial or biennial herbs, often resinous-viscid, ours glabrous and leafy with sessile or clasping alternate and spinulose-serrate or laciniate rigid leaves, and large heads terminating leafy branches. Disk and ray yellow. (Prof. *Grindel*, a Russian botanist.)

1. **G. squarròsa,** Dunal. Leaves spatulate- to linear-oblong; involucre squarrose; achenes not toothed; pappus-awns 2 or 3. — Prairies, Minn., southward and westward; Evanston, Ill. — Var. NÙDA, Gray. Rays wanting. About St. Louis and westward.

2. **G. lanceolàta,** Nutt. Leaves lanceolate or linear; involucral scales erect or the lower tips spreading; achenes with 1 or 2 short teeth at the summit; awns 2. — Prairies, eastern Kan. to Ark., and southward.

## 13. HETEROTHÈCA, Cass.

Characters as in Chrysopsis, but the achenes of the ray thickish or triangular, without pappus or obscurely crowned, and those of the disk compressed, with a double pappus, the inner of numerous long bristles, the outer of many short and stout bristles. — (From ἕτερος, *different*, and θήκη, *case*, alluding to the unlike achenes.)

1. **H. Lamárckii,** Cass. Annual or biennial, 1–3° high, bearing numerous small heads; leaves oval or oblong, the lower with petioles auricled at base, the upper mostly subcordate-clasping. — S. E. Kan., and southward.

## 14. CHRYSÓPSIS, Nutt. GOLDEN ASTER.

Heads many-flowered, radiate; the rays numerous, pistillate. Involucral scales linear, imbricated, without herbaceous tips. Receptacle flat. Achenes obovate or linear-oblong, flattened, hairy; pappus in all the flowers double, the outer of very short and somewhat chaffy bristles, the inner of long capillary bristles. — Chiefly perennial, low herbs, woolly or hairy, with rather large often corymbose heads terminating the branches. Disk and ray-flowers yellow. (Name composed of χρυσός, *gold*, and ὄψις, *aspect*, from the golden blossoms.)

* *Leaves narrowly lanceolate or linear; achenes linear.*

1. **C. graminifòlia,** Nutt. *Silvery-silky*, with long close-pressed hairs; stem slender, often with runners from the base, naked above, bearing few heads; *leaves lanceolate or linear, elongated, grass-like, nerved, shining*, entire. — Dry sandy soil, Del. to Va., and southward. July–Oct.

2. **C. falcàta,** Ell. *Stems* (4 – 10′ high) very woolly; *leaves crowded, linear, rigid, about 3-nerved,* entire, *somewhat recurred or scythe-shaped, hairy,* or smooth when old, sessile; heads (small) corymbed. — Dry sandy soil on the coast, pine barrens of N. J. to Nantucket and Cape Cod, Mass. Aug.

* * *Leaves oblong or lanceolate, entire or slightly serrate, mostly sessile, veined, not nerved; achenes obovate, flattened.*

3. **C. gossýpina,** Nutt. *Densely woolly all over; leaves spatulate or oblong, obtuse* (1 – 2′ long); heads larger than in the next. — Pine barrens, Va., and southward. Aug. – Oct.

4. **C. Mariàna,** Nutt. *Silky with long and weak hairs,* or when old smoothish; *leaves oblong;* heads corymbed, on glandular peduncles. — Dry barrens, from S. New York and Penn., southward, near the coast. Aug. – Oct.

5. **C. villòsa,** Nutt. *Hirsute and villous-pubescent;* stem corymbosely branched, the branches terminated by single short-peduncled heads; *leaves narrowly oblong, hoary with rough pubescence* (as also the involucre), *bristly-ciliate* toward the base. — Dry plains and prairies, Wisc. to Ky., and westward. July – Sept. Very variable. — Var. HÍSPIDA, Gray. Low, hirsute and hispid, not canescent; heads small. Kan., west and southward. — Var. CANÉSCENS, Gray. Wholly canescent with short appressed pubescence; leaves narrow, mostly oblanceolate. — Kan. to Tex.

6. **C. pilòsa,** Nutt. Annual, soft-hirsute or villous; leaves oblong-lanceolate; involucre viscid; outer pappus chaffy and conspicuous. — Kan. and southward

## 15. APLOPÁPPUS, Cass.

Heads many-flowered, radiate; rays many, pistillate. Involucre hemispherical, of many closely imbricated scales in several series. Receptacle flat. Achenes short, turbinate to linear; pappus simple, of numerous unequal bristles. — Mostly herbaceous perennials, with alternate rigid leaves. Ray- and disk-flowers yellow. (From ἁπλόος, *simple,* and πάππος, *pappus.*)

1. **A. ciliàtus,** DC. Annual or biennial, glabrous, 2 - 5° high, leafy; leaves oval (or lower obovate), obtuse, dentate with bristle-pointed teeth; heads very large, few and clustered, the outer scales spreading; achenes glabrous, the central abortive. — Mo., Kan., and southward.

2. **A. spinulòsus,** DC. Perennial, branching, puberulent or glabrate, low; leaves narrow, pinnately or bipinnately parted, the lobes and teeth bristle-tipped; heads small, the appressed scales bristle-tipped; achenes pubescent. — Minn. to Kan., and southward.

3. **A. divaricàtus,** Gray. Annual, 1 – 2° high, slender and diffusely paniculate, rough-pubescent or glabrate; leaves rigid, narrow, entire or with a few spinulose teeth, much reduced above; heads small and narrow, the appressed scales subulate, attenuate; achenes silky. — Southern Kan.

## 16. BIGELÒVIA, DC. RAYLESS GOLDEN-ROD.

Heads 3 - 4-flowered, the flowers all perfect and tubular. Involucre club-shaped, yellowish; the rigid somewhat glutinous scales linear, closely imbricated and appressed. Receptacle narrow, with an awl-shaped prolongation in the centre. Achenes somewhat obconical, hairy; pappus a single row of capillary bristles. — Flowers yellow. Leaves scattered, oblanceolate or linear, 1 – 3-nerved. A large western genus, few species approaching our limits. (Dedicated by De Candolle to *Dr. Jacob Bigelow*, author of the Florula Bostoniensis, and of the American Medical Botany.)

1. **B. nudàta,** DC. A smooth perennial; the slender stem (1 – 2° high) simple or branched from the base, naked above, corymbose at the summit, bearing small heads in a flat-topped corymb. — Low pine barrens, N. J. (rare), and southward. Sept.

## 17. SOLIDÀGO, L. GOLDEN-ROD.

Heads few – many-flowered, radiate; the rays 1 – 16, pistillate. Scales of the oblong involucre appressed, destitute of herbaceous tips (except n. 1 and 2). Receptacle small, not chaffy. Achenes many-ribbed, nearly terete; pappus simple, of equal capillary bristles. — Perennial herbs, with mostly wand-like stems and nearly sessile stem-leaves, never heart-shaped. Heads small, racemed or clustered; flowers both of the disk and ray (except n. 6) yellow. (Name from *solidus* and *ago*, to join, or make whole, in allusion to reputed vulnerary qualities.) Flowering in autumn.

### Conspectus of Groups.

| | |
|---|---|
| Heads small, sessile in flat-topped corymbs; leaves linear | 41, 42 |
| Heads all more or less pedicelled. | |
| Involucral scales rigid, with spreading herbaceous tips | 1, 2 |
| Involucral scales without green tips. | |
| Heads in a compound terminal corymb, not at all racemose | 37 – 40 |
| Heads small, mostly clustered in the axils of feather-veined leaves | 3 – 7 |
| Heads mostly large, in a terminal thyrse; leaves feather-veined. | |
| Western species | 8, 9 |
| Northern or mountain species | 10 – 12 |
| Heads mostly small or middle-sized: inflorescence paniculate (sometimes thyrsoidal). | |
| Leaves 3-ribbed; heads in 1-sided spreading panicled racemes. | |
| Stem and leaves smooth and glabrous | 29 – 32 |
| Pubescent or scabrous | 33 – 36 |
| Leaves not 3-ribbed, or only obscurely triple-nerved. | |
| Heads large; leaves thickish, very smooth, entire. Seashore | 13 |
| Panicle virgate or thyrsoid; leaves nearly entire | 14 – 17 |
| Heads very small in a short broad panicle: leaves nearly entire | 18 – 20 |
| Heads racemosely paniculate; leaves ample, the lower serrate | 21 – 28 |

### § 1. VIRGAÙREA. *Rays mostly fewer than the disk-flowers; heads all more or less pedicelled.*

* *Scales of the much imbricated and rigid involucre with abruptly spreading herbaceous tips; heads in clusters or glomerate racemes, disposed in a dense somewhat leafy and interrupted wand-like compound spike.*

1. **S. squarròsa,** Muhl. Stem stout (2 – 5° high), hairy above; leaves large, oblong, or the lower spatulate-oval and tapering into a margined petiole, serrate, veiny; heads numerous; scales obtuse or acute; disk-flowers 16 – 24, the rays 12 – 16. — Rocky and wooded hills, Maine and W. Vt. to Penn., Ohio, and the mountains of Va.; rather rare.

2. **S. petiolàris,** Ait. Minutely hoary or downy; stem strict, simple (1 – 3° high); leaves small ($\frac{1}{2}$ – 2′ long), oval or oblong, mucronate, veiny, rough-ciliolate; the upper entire and abruptly very short-petioled, the lower often ser-

rate and tapering to the base; heads few, in a wand-like raceme or panicle, on slender bracted pedicels; rays about 10, elongated; scales of the pubescent involucre lanceolate or linear-awl-shaped, the outer loose and spreading, more or less foliaceous. — S. W. Ill. to Kan. and southward. — The name is misleading, as the leaves are hardly petioled.

* * *Involucral scales without green tips and wholly appressed.*

+ *Heads small (3″ long), clustered along the stem in the axils of the feather-veined leaves, or the upper forming a thyrse.*

++ *Achenes pubescent.*

3. **S. cæsia,** L. Smooth; *stem terete, mostly glaucous,* at length much branched and diffuse; *leaves lanceolate* or oblong-lanceolate, serrate, pointed, sessile; heads in very short clusters, or somewhat racemose-panicled on the branches. — Rich woodlands, common; west to S. E. Minn., Ill., and Ky.

4. **S. latifòlia,** L. Smooth or nearly so; *stem angled, zigzag,* simple or paniculate-branched (1 – 3° high); *leaves broadly ovate or oval, very strongly and sharply serrate, conspicuously pointed at both ends* (thin, 3 – 6′ long); heads in very short axillary clusters, or the clusters somewhat prolonged at the end of the branches; rays 3 – 4. — Moist shaded banks; common northward, and south along the mountains.

5. **S. Curtísii,** Torr. & Gray. Smooth or nearly so; stem angled, usually branched; leaves oblong to long-lanceolate with narrowed entire base, serrate above with subulate teeth; heads in small, loose clusters; rays 4 – 7. — Open woods at low elevations in the mountains of Va. and southward.

++ ++ *Achenes glabrous; inflorescence more thyrsoid.*

6. **S. bícolor,** L. *Hoary or grayish with soft hairs;* stem mostly simple; leaves oblong or elliptical-lanceolate, acute at both ends, or the lower oval and tapering into a petiole, slightly serrate; *clusters or short racemes from the axils of the upper leaves,* forming an interrupted spike or crowded panicle; scales very obtuse; *rays* (5 – 14) *small, cream-color or nearly white.* — Var. CÓNCOLOR, Torr. & Gray, has the *rays yellow.* — Dry copses, west to Minn. and Mo.

7. **S. montícola,** Torr. & Gray. Nearly glabrous; stem slender, 1 – 2° high; leaves oblong-ovate to lanceolate, acute or tapering at both ends, the lower sparingly serrate; heads small, the scales acutish; rays 5 – 6. — Alleghany Mts., from Md. southward.

+ + *Heads mostly large (smaller in* n. 12), *many-flowered, forming an erect terminal thyrse; leaves feather-veined.*

++ *Leaves numerous, short, sessile, entire, uniform in size and shape; western.*

8. **S. Bigelòvii,** Gray. Cinereous-puberulent, 2° high; leaves oval and oblong, mostly obtuse at both ends; thyrse rather loose; involucre broad. — S. Kan. and southward. Probably running into the next.

9. **S. Lindheimeriàna,** Scheele. Less puberulent; leaves lanceolate or oblong, more acute; heads narrower and more densely clustered; achenes glabrous. — S. Kan. and southward.

++ ++ *Northern or mountain species, bright green.*

10. **S. macrophýlla,** Pursh. *Stem stout* (1 – 4° high), *wand-like,* pubescent near the summit, simple; *leaves thin, ovate, irregularly and coarsely serrate*

*with sharp salient teeth, large* (lower 3 – 4′ long), all but the uppermost abruptly contracted into *long and margined petioles; heads large* (5 – 6″ long), many-flowered, crowded in an oblong or wand-like raceme or contracted panicle (2 – 18′ long); scales loose and thin, long, lanceolate, taper-pointed; rays 8 – 10, elongated; achenes smooth. (S. thyrsoidea, *E. Mey.*) — Wooded sides of mountains, N. Maine to N. Y. (south to the Catskills), shore of L. Superior, and northward. — Very near a European form of S. Virgaurea.

11. **S. Virgaùrea,** Linn. An extremely variable and confused species in the Old World, represented in North America by

Var. **alpìna,** Bigel. Dwarf (1 – 8′ high), with few (1 – 12) pretty large heads (3 – 4″ long, becoming smaller as they increase in number); leaves thickish, mostly smooth, spatulate or obovate, mostly obtuse, finely serrate or nearly entire, the uppermost lanceolate; heads few in a terminal cluster or subsolitary in the upper axils; *scales* lanceolate, *acute or acutish;* rays about 12. — Alpine summits of Maine, N. H., and N. Y., and shore of L. Superior.

12. **S. hùmilis,** Pursh. Low (6 – 12′ high) and smooth, bearing several or numerous loosely thyrsoid smaller heads, which, with the peduncles, etc., are mostly somewhat glutinous; *scales obtuse;* rays 6 – 8, short; upper leaves lanceolate to linear, entire, the lower becoming spatulate and sparingly serrate. (S. Virgaurea, var. humilis, *Gray.*) — Rocky banks, W. Vt., along the Great Lakes, and northward; also on islands in the Susquehanna, near Lancaster, and at the Falls of the Potomac. — At the base of the White Mountains, on gravelly banks, occurs a form with the minutely pubescent stout stem 1 – 2° high, the leaves larger, broader, and coarsely toothed, and the heads very numerous in an ample compound raceme; rays occasionally almost white.

Var. **Gillmàni,** Gray. Larger (2° high), rigid, with compound ample panicle and laciniately toothed leaves. — Sand-hills of the lake-shores, N. Mich.

+- +- +- *Heads small or middle-sized (large in* n. 13 *and* 17), *panicled or sometimes thyrsoidal, not in a terminal corymbiform cyme; not alpine.*

++ *Leaves veiny, not 3-ribbed, but sometimes obscurely triple-nerved.*

= 1. *Heads commonly large; leaves thickish, very smooth, entire, elongated.*

13. **S. sempérvirens,** L. Smooth and stout (1 – 8° high); leaves lanceolate, slightly clasping, or the lower ones lanceolate-oblong, obscurely triple-nerved; racemes short, in an open or contracted panicle. — Salt marshes, or rocks on the shore, Maine to Va. — Heads showy; the golden rays 7 – 10. Varies, in less brackish swamps, with thinner elongated linear-lanceolate leaves, tapering to each end, and more erect racemes in a narrower panicle.

= 2. *Heads small, in a narrow virgate or thyrsoid panicle; scales thin, acute; leaves nearly entire.*

14. **S. stricta,** Ait. *Very smooth* throughout; *stem strict and simple, wand-like* (2 – 4° high), slender, beset with small and entire appressed lanceolate-oblong thickish leaves, gradually reduced upward to mere bracts; the lowest oblong-spatulate; *heads crowded in a very narrow compound spicate raceme;* rays 5 – 7. (S. virgata, *Michx.*) — Damp pine barrens, N. J. and southward.

15. **S. pubérula,** Nutt. *Stem* (1 – 3° high, simple or branched) *and panicle minutely hoary; stem-leaves lanceolate, acute, tapering to the base*, smoothish; the lower wedge-lanceolate and *sparingly toothed*; *heads* very numerous and

*crowded in compact short racemes forming a prolonged and dense* narrow or pyramidal *panicle; scales linear-awl-shaped*, appressed; rays about 10. — Sandy soil, Maine to Va. and southward, mostly near the coast.

= 3. *Heads middle-sized, in a thyrsoid panicle; involucral scales rather firm, obtuse; leaves entire or little serrate, smooth.*

16. **S. uliginòsa,** Nutt. *Smooth* nearly throughout; stem simple, strict (2 – 3° high); *leaves lanceolate*, pointed, the lower tapering into winged petioles, partly sheathing at the base, sparsely serrulate or entire; *racemes much crowded and appressed in a dense wand-like panicle;* scales linear-oblong; rays 5 – 6, small. (S. stricta, *Man.*) — Peat-bogs, Maine to Penn., Minn., and northward. Root-leaves 6 – 10′ long. Flowers earlier than most species, beginning in July.

17. **S. speciòsa,** Nutt. Stem stout (3 – 6° high), smooth; *leaves thickish, smooth* with rough margins, *oval or ovate*, slightly serrate, the uppermost oblong-lanceolate, the lower contracted into a margined petiole; *heads* somewhat crowded *in numerous erect racemes, forming an ample pyramidal or thyrsiform panicle;* peduncles and pedicels rough-hairy; scales of the cylindrical involucre oblong; rays about 5, large. — Var. ANGUSTÀTA, Torr. & Gray, is a dwarf form, with the racemes short and clustered, forming a dense interrupted or compound spike. — Copses, Maine to Minn., and southward. — A very handsome species; the lower leaves 4 – 6′ long and 2 – 4′ wide in the larger forms.

= 4. *Heads very small in slender spreading secund clusters forming a mostly short and broad panicle; leaves entire or nearly so.*

18. **S. odòra,** Ait. (SWEET GOLDEN-ROD.) *Smooth* or nearly so throughout; *stem slender* (2 – 3° high), *often reclined; leaves linear-lanceolate, entire*, shining, *pellucid-dotted;* racemes spreading in a small one-sided panicle; rays 3 – 4, rather large. — Border of thickets in dry or sandy soil, Maine and Vt. to Ky., and southward. — The crushed leaves yield a pleasant anisate odor; but an occasional form is nearly scentless.

19. **S. tortifòlia,** Ell. Stem scabrous-puberulent, 2 – 3° high; leaves linear, short, commonly twisted, roughish-puberulent or glabrate; rays very short. — Dry soil, coast of Va. and southward.

20. **S. pilòsa,** Walt. *Stem stout, upright* (3 – 7° high), *clothed with spreading hairs; leaves oblong-lanceolate, roughish, hairy beneath*, at least on the midrib, serrulate, the upper ovate-lanceolate or oblong and entire, closely sessile; racemes many, recurved, in a dense pyramidal panicle; rays 7 – 10, very short. — Low grounds, pine barrens of N. J. to Va. and southward.

= 5. *Heads small or middle-sized, racemosely paniculate; leaves broad or ample, veiny, at least the lower serrate* (*or entire in* n. 28); *involucral scales obtuse.*

21. **S. pátula,** Muhl. *Stem strongly angled, smooth* (2 – 4° high); *leaves* (4 – 8′ long) *ovate*, acute, serrate, pale, *very smooth and veiny underneath*, but the *upper surface very rough*, like shagreen; racemes rather short and numerous on the spreading branches; heads rather large. — Swamps; common.

22. **S. rugòsa,** Mill. *Rough-hairy, especially the very leafy stem* (1 – 6° high); *leaves ovate-lanceolate, elliptical or oblong, often thickish and very rugose;* racemes spreading; involucral scales linear; rays 6 – 9; the disk-flowers 4 – 7. (S. altissima, *Torr. & Gray*, not *L.*) — Borders of fields and copses; very com-

mon, presenting a great variety of forms; usually one of the lowest of the common *Golden-rods.* It flowers early. Aug. – Sept.

23. **S. ulmifòlia,** Muhl. *Stem smooth,* the branches hairy; *leaves thin, elliptical-ovate or oblong-lanceolate,* pointed, *tapering to the base,* loosely veined, beset with soft hairs beneath; racemes panicled, recurved-spreading; involucral scales lanceolate-oblong; rays about 4. — Low copses; common. — Too near the last; distinguished only by its smooth stem and thin larger leaves.

24. **S. Ellióttii,** Torr. & Gray. *Smooth;* stem stout (1 – 3° high), *very leafy; leaves elliptical or oblong-lanceolate,* acute (2 – 3′ long), closely sessile, slightly serrate, strongly veined, *thick, smooth both sides, shining above; heads in dense spreading racemes which are crowded in a close pyramidal panicle;* peduncles and achenes strigose-pubescent. (S. elliptica, *Torr. & Gray,* not *Ait.*) — Swamps (fresh or brackish) near the coast, Mass. to N. J. and southward. — Heads showy, 3″ long; the rays 8 – 12.

25. **S. neglécta,** Torr. & Gray. *Smooth;* stem stout (2 – 4° high), less leafy; *leaves thickish, smooth both sides, opaque; the upper oblong-lanceolate,* mostly acute and nearly entire; the *lower ovate-lanceolate or oblong,* sharply serrate, tapering into a petiole; *racemes short and dense, at length spreading,* disposed in an elongated or pyramidal close panicle; peduncles and achenes nearly glabrous. — Swamps, Maine to Md., Wisc., and Minn. — Heads rather large, crowded; the racemes at first erect and scarcely one-sided. Very variable, the forms approaching n. 16 and 27.

Var. **linoìdes,** Gray. The most slender form; radical leaves 4 – 8′ long and 4 – 6″ wide, the upper very small, erect; branches of panicle rather few, one-sided; rays 2 – 5. (S. linoides, *Torr. & Gray.*) — Mass. to N. J.

26. **S. Boòttii,** Hook. Smooth, or scabrous-pubescent or below hirsute, slender, often branched, 2 – 5° high; leaves rather finely serrate, ovate to oblong-lanceolate, pointed; the upper small, oblong to narrowly lanceolate, often entire; heads loosely racemose; rays 1 – 5 or none; achenes pubescent. — Dry grounds, Va. and southward.

27. **S. argùta,** Ait. *Smooth; stem angled; leaves* (large and thin) *ovate,* and the upper elliptical-lanceolate, *very sharply and strongly serrate* (entire only on the branches), *pointed at both ends,* the lowest on margined petioles; *racemes pubescent, spreading, disposed in an elongated open panicle; rays* 6 – 7, *large;* achenes usually glabrous. (S. Muhlenbergii, *Torr. & Gray.*) — Copses and moist woods, N. H. to Penn., Ont., and N. E. Minn. — Racemes much shorter and looser than in the next; the involucral scales thin and more slender; the heads somewhat larger, fully 3″ long.

28. **S. júncea,** Ait. *Smooth throughout* (1 - 3° high); *radical and lower stem-leaves elliptical or lanceolate-oval, sharply serrate* with spreading teeth, *pointed,* tapering into winged and ciliate petioles; *the others lanceolate or narrowly oblong,* slightly triple-nerved, tapering to each end, the *uppermost entire; racemes dense, naked, at length elongated and recurved, forming a crowded and flat corymb-like panicle: rays* 8 – 12, *small.* (S. arguta, *Torr. & Gray.*) — Var. SCABRÉLLA, Gray, is somewhat roughish-pubescent (Wisc. to Ky.). — Copses and banks; common. Well distinguished by its long or drooping racemes, and the closely appressed rigid scales of the involucre, small rays, etc. Heads seldom over 2″ long, the scales small and pale.

↔ ↔ *Leaves more or less plainly 3-ribbed; heads in one-sided spreading or recurved racemes, forming an ample panicle. Not maritime.*

= *Smooth and glabrous, at least the stem and bright green leaves.*

a. *Leaves firm and rather rigid; involucral scales thickish, obtuse, quite unequal.*

29. **S. Missouriénsis,** Nutt. Smooth throughout (1–3° high); *leaves linear-lanceolate,* or the lower broadly lanceolate, tapering to both ends, with very rough margins; teeth, if any, sharp and rigid; heads and dense crowded racemes nearly as in n. 28; *achenes nearly glabrous.* — Dry prairies, from Wisc. and Ind. south and westward. — Heads 1½–2″ long.

30. **S. Shórtii,** Torr. & Gray. Stem slender, simple (2–4° high), minutely roughish-pubescent above; *leaves* (the larger 2–3′ long) *oblong-lanceolate,* acute, the lower mostly serrate with a few fine teeth; racemes mostly short in a crowded panicle; *achenes silky-pubescent.* — Rocks at the Falls of the Ohio; Ark. — A handsome species; heads 3″ long, narrow.

b. *Leaves thinner; involucral scales thin, chiefly linear, obtuse.*

31. **S. serótina,** Ait. *Stem* stout (2–7° high), *smooth, often glaucous; leaves quite smooth both sides,* lanceolate, taper-pointed, very sharply serrate, except the narrowed base, rough-ciliate; the ample panicle pubescent; *rays* 7–14, *rather long.* (S. gigantea, of previous ed.) — Copses and fence-rows; common, and presenting many varieties. Seldom very tall.

Var. **gigantèa,** Gray. Commonly tall, 5–8° high; leaves more or less pubescent or hispidulous beneath. (S. gigantea, *Ait.;* S. serotina of previous ed.) — Thickets and low grounds, Can. to Tex.

32. **S. rupéstris,** Raf. *Stem smooth, slender,* 2–3° high; *leaves linear-lanceolate, tapering both ways, entire* or nearly so; panicle narrow; *heads very small; rays* 4–6, *very short.* — Rocky river-banks, W. Va. to Ky. and Ind.

= = *Pubescent* (*at least the stem*) *or hispidulous-scabrous.*

33. **S. Canadénsis,** L. *Stem rough-hairy,* tall and stout (3–6° high); *leaves lanceolate,* pointed, sharply serrate (sometimes almost entire), *more or less pubescent beneath and rough above; heads small; rays very short.* — Borders of thickets and fields; very common. — Varies greatly in the roughness and hairiness of the stem and leaves, the latter oblong-lanceolate or elongated linear-lanceolate; — in var. PRÒCERA, whitish-woolly underneath; and in var. SCÀBRA also very rough above, often entire, and rugose-veined.

34. **S. nemoràlis,** Ait. *Clothed with a minute and close grayish-hoary* (soft or roughish) *pubescence;* stem simple or corymbed at the summit (½–2½° high); leaves *oblanceolate or spatulate-oblong,* the lower somewhat crenate-toothed and tapering into a petiole; racemes numerous, dense, at length recurved, forming a large and crowded compound raceme or panicle which is usually turned to one side; scales of the involucre linear-oblong, appressed; rays 5–9. — Dry sterile fields; very common. Flowers very bright yellow, beginning early in Aug. — Var. INCÀNA, Gray, of Minn., and westward, is a dwarf form, with rigid oval or oblong leaves, rather strongly serrate or entire, and the clusters of heads in a dense oblong or conical thyrse.

35. **S. rádula,** Nutt. Stem and *oblong or obovate-spatulate leaves rigid and very rough, not hoary,* the upper sessile; scales oblong, rigid; rays 3–6; otherwise nearly as in n. 34. — Dry hills, W. Ill., Minn., Kan., and southward.

36. **S. Drummóndii,** Torr. & Gray. *Stem* (1 – 3° high) *and lower surface of the broadly ovate or oval somewhat triple-ribbed leaves minutely velvety-pubescent,* some of the leaves almost entire; racemes panicled, short; scales of the involucre oblong, obtuse; rays 4 or 5. — S. W. Ill., Mo., and southward.

+ + + + *Heads in a compound corymb terminating the simple stem, not at all racemose; leaves mostly with a strong midrib.*

++ *Leaves flat, not 3-nerved.*

37. **S. rígida,** L. *Rough and somewhat hoary* with a minute pubescence; stem stout (2 – 5° high), very leafy; corymb dense; *leaves oval or oblong,* copiously feather-veined, thick and rigid; the upper closely sessile by a broad base, slightly serrate, the uppermost entire; heads large, over 30-flowered; the rays 7 – 10. — Dry soil, N. Eng. to Minn., and southward.

38. **S. Ohioénsis,** Riddell. *Very smooth* throughout; stem wand-like, slender, leafy (2 – 3° high); *stem-leaves oblong-lanceolate, flat,* entire, obscurely feather-veined, closely sessile; the lower and radical ones elongated, slightly serrate toward the apex, tapering into long margined petioles; heads numerous, on smooth pedicels, small, 16 – 20-flowered; the rays 6 or 7. — Moist meadows or prairies, W. New York to Ind. and Wisc. — Root-leaves 1° long; the upper reduced to 1 – 2′, with rough margins, like the rest.

++ ++ *Leaves somewhat folded, entire, the lower slightly 3-nerved.*

39. **S. Riddéllii,** Frank. *Smooth and stout* (2 – 4° high), *very leafy,* the branches of the dense corymb and pedicels rough-pubescent; *leaves linear-lanceolate, elongated* (4 – 6′ long), acute, partly clasping or sheathing, *mostly recurved,* the lowest elongated-lanceolate and tapering into a long keeled petiole; *heads very numerous,* clustered, 20 – 30-flowered; the rays 7 – 9. — Wet grassy prairies, Ohio to Minn. and Mo.; Ft. Monroe, Va. — Heads larger than in the last, 2 – 3″ long. Stem-leaves upright and partly sheathing at the base, then gradually recurved-spreading.

40. **S. Houghtònii,** Torr. & Gray. *Smooth; stem rather low and slender* (1 – 2° high); *leaves scattered, linear-lanceolate, acutish,* tapering into a narrowed slightly clasping base, or the lower into margined petioles; *heads few or several,* 20 – 30-flowered; the rays 7 – 9. — Swamps, north shore of Lake Michigan; Genesee Co., N. Y. July, Aug. — Leaves rough-margined, 2 – 5′ long, 2 – 4″ wide, 1-nerved, or the lower obscurely 3-nerved above; veins obscure. Heads large, nearly ½′ long. Scales of the involucre obtuse.

§ 2. EUTHÀMIA. *Corymbosely much branched; heads small, sessile, in little clusters crowded in flat-topped corymbs; the closely appressed involucral scales somewhat glutinous; receptacle fimbrillate; rays* 6 – 20, *short, more numerous than the disk-flowers; leaves narrow, entire, sessile.*

41. **S. lanceolàta,** L. *Leaves lanceolate-linear,* 3 – 5-*nerved;* the nerves, margins, and angles of the branches minutely rough-pubescent; heads obovoid-cylindrical, in dense corymbed clusters; *rays* 15 – 20. — River-banks, etc., in moist soil; common. — Stem 2 – 3° high; leaves 3 – 5′ long.

42. **S. tenuifòlia,** Pursh. Smooth, slender; *leaves very narrowly linear, mostly* 1-*nerved, dotted;* heads obovoid-club-shaped, in numerous clusters of 2 or 3, disposed in a loose corymb; *rays* 6 – 12. — Sandy fields, Mass. to Ill., and southward; common near the coast.

### 18. BRACHYCHÆ̀TA, Torr. & Gray. False Golden-rod.

Heads and flowers nearly as in Solidago, except the pappus, which is a row of minute rather scale-like bristles, shorter than the achene. — A perennial herb, with rounded or ovate serrate leaves, all the *lower ones heart-shaped;* the small yellow heads in sessile clusters racemed or spiked on the branches. (Name composed of *βραχύς*, *short*, and *χαίτη*, *bristle*, from the pappus.)

1. **B. cordàta,** Torr. & Gray. Wooded hills, S. Ind. and E. Ky. to N. Ga. Oct. — Plant 2 – 4° high, slender, more or less pubescent.

### 19. BÉLLIS, Tourn. Daisy.

Heads many-flowered, radiate; the rays numerous, pistillate. Scales of the involucre herbaceous, equal, in about 2 rows. Receptacle conical, naked. Achenes obovate, flattened, wingless, and without any pappus. — Low herbs (all but our single species natives of the Old World), either stemless, like the true *Daisy*, B. perennis (which is found as an occasional escape from cultivation), or leafy-stemmed, as is the following. (The Latin name, from *bellus*, pretty.)

1. **B. integrifòlia,** Michx. (Western Daisy.) Annual or biennial, diffusely branched (4′ – 1° high), smoothish; leaves lanceolate or oblong, the lower spatulate-obovate; heads on slender peduncles; rays pale violet-purple. — Prairies and banks, Ky. and southwestward. March – June.

### 20. APHANÓSTEPHUS, DC.

Involucral scales in few series, broadly lanceolate, the outer shorter. Achenes prismatic, the broad truncate apex bearing a short coroniform pappus. Otherwise as Bellis. — Southwestern leafy-stemmed and branching pubescent herbs, with solitary terminal daisy-like heads. (*'Αφανής*, *inconspicuous*, and *στέφος*, *crown;* in allusion to the pappus.)

1. **A. Arkansànus,** Gray. Diffuse, 1° high; leaves oblong-spatulate to broadly lanceolate, the lower often toothed or lobed; rays white to purple, ½′ long; pappus mostly 4 – 5-lobed. — Plains of Kan. and southward.

### 21. CHÆTOPÁPPA, DC.

Heads several-flowered, radiate; disk-flowers often sterile. Involucral bracts imbricated in 2 or more rows, the outer shorter. Receptacle flat, naked. Achenes fusiform or compressed; pappus of 5 or fewer thin nerveless paleæ, alternating with rough bristly awns, or these wanting. — Low southwestern branching annuals, with narrow entire leaves and solitary terminal heads; ray white or purple. (*Χαίτη*, *a bristle*, and *πάππος*, *pappus*.)

1. **C. asteroìdes,** DC. Slender, 2 – 10′ high, pubescent; involucres narrow, 2″ long; rays 5 – 12; achenes pubescent. — Dry grounds, Vernon Co., Mo., and southward.

### 22. BOLTÒNIA, L'Her.

Heads many-flowered, radiate; the rays numerous, pistillate. Scales of the hemispherical involucre imbricated somewhat in 2 rows, appressed, with narrow membranaceous margins. Receptacle conical or hemispherical, naked. Achenes very flat, obovate or inversely heart-shaped, margined with a callous wing, or in the ray 3-winged, crowned with a pappus of several minute bristles and usually 2 – 4 longer awns. — Perennial and bushy-branched smooth herbs, pale green, with the aspect of Aster; the thickish leaves chiefly entire, often turned edgewise. Flowers autumnal; disk yellow; rays white or purplish. (Dedicated to *James Bolton*, an English botanist of the last century.)

* *Heads middle-sized, loosely corymbed.*

1. **B. asteroìdes,** L'Her. Stems 2 – 8° high; leaves lanceolate; involucral scales acuminate; pappus of few or many minute bristles and 2 awns or none. (B. glastifolia, *L'Her.*, the awned form.) — Moist places along streams; Penn. to Ill., and southward to Fla. Sept., Oct. — Var. DECÚRRENS, Engelm., a large form with the leaves alate-decurrent upon the stem and branches. Mo. (*Eggert*).

2. **B. latisquàma,** Gray. Heads rather larger; involucral scales oblong to ovate, obtuse or mucronate-apiculate; pappus-awns conspicuous. — W. Mo. and Kan.

* * *Heads small, panicled on the slender branches.*

3. **B. diffùsa,** L'Her. Stem diffusely branched; leaves lance-linear, those on the branchlets very small and awl-shaped; rays short, mostly white; pappus of several very short bristles and 2 short awns. — Prairies of S. Ill. (*Vasey*), and southwestward. Aug. – Oct.

### 23. TOWNSÉNDIA, Hook.

Heads many-flowered, the numerous ray-flowers (violet to white) in a single series, fertile. Involucre broad, the lanceolate scariously margined scales imbricated in several series. Receptacle flat, naked. Achenes obovate or oblong, flattened, with thickish margins and beset with forked-capitellate hairs; pappus a single row of long awns or coarse rigid bristles, or reduced in the ray to chaffy scales. — Low scarcely caulescent herbs, with linear to spatulate entire leaves and large heads. (Named for *David Townsend*, botanical associate of Dr. Darlington of Penn.)

1. **T. sericea,** Hook. Acaulescent silky-pubescent perennial; heads sessile, solitary or few, ½ – 1′ high; ray-pappus mostly bristly. — Dry plains, central Neb., north and westward. April, May.

### 24. SERICOCÁRPUS, Nees. WHITE-TOPPED ASTER.

Heads 12 – 20-flowered, radiate; the rays about 5, fertile (white). Involucre somewhat cylindrical or club-shaped; the scales closely imbricated in several rows, cartilaginous and whitish, appressed, with short and abrupt often spreading green tips. Receptacle alveolate-toothed. Achenes short, inversely pyramidal, very silky; pappus simple, of numerous capillary bristles. — Perennial tufted herbs (1 - 2° high), with sessile somewhat 3-nerved leaves, and small heads mostly in little clusters, disposed in a flat corymb. Disk-flowers pale yellow. (Name from σηρικός, *silky*, and καρπός, *fruit.*)

* *Pappus rusty; leaves sparingly serrate, veiny, rather thin.*

1. **S. conyzoìdes,** Nees. Somewhat pubescent; leaves oblong-lanceolate or the lower spatulate, ciliate; heads rather loosely corymbed, obconical (4 – 6″ long). — Dry ground; Maine to Ohio, and southward. July.

* * *Pappus white; leaves entire, obscurely veined, firmer and smaller.*

2. **S. solidagíneus**, Nees. Smooth, slender; leaves linear, rigid, obtuse, with rough margins, tapering to the base; heads narrow (3″ long), in close clusters, few-flowered. — Thickets, S. New Eng. to Tenn., and southward. July.

3. **S. tortifòlius**, Nees. Hoary-pubescent; leaves obovate or oblong-spatulate, short (½ – 1′ long), vertical, both sides alike; heads rather loosely corymbed, obovoid (4 – 5″ long). — Pine woods, Va. and southward. Aug.

## 25. ÁSTER, L. STARWORT. ASTER.

Heads many-flowered, radiate; the ray-flowers in a single series, fertile. Scales of the involucre more or less imbricated, usually with herbaceous or leaf-like tips. Receptacle flat, alveolate. Achenes more or less flattened; pappus simple, of capillary bristles (double in §§ 4 and 5). — Perennial herbs (annual only in §§ 7 and 8), with corymbed, panicled, or racemose heads; flowering in autumn. Rays white, purple, or blue; the disk yellow, often changing to purple. (Name ἀστήρ, *a star*, from the radiate heads of flowers.)

### Conspectus of Groups.

| | |
|---|---|
| Annuals, with copious fine soft pappus | 53, 54 |
| Pappus double | 46–48 |
| Scales closely imbricated, not green-tipped, often scarious-edged | 49–52 |
| Scales closely imbricated, scarcely at all herbaceous; leaves cordate, serrate | 2, 3 |
| Scales nearly equal, rigid, more or less foliaceous; pappus-bristles rigid, some thickened at top | 1 |
| Scales with herbaceous tips or the outer wholly foliaceous. ASTER proper. | |
| Pappus rigid; stem-leaves sessile, none cordate or clasping; heads few, large | 4–8 |
| Leaves silvery-silky both sides, sessile, entire | 14, 15 |
| Lower leaves more or less cordate, petiolate | 17–24 |
| Leaves entire, lower not cordate, cauline sessile with cordate-clasping base | 16 |
| Involucre (and branchlets) viscid or glandular; leaves not cordate, mostly entire, the cauline all sessile or clasping | 9–13 |
| Lower leaves all acute at base; not glandular nor viscid nor silky-canescent. | |
| Smooth and glabrous, usually glaucous; scales coriaceous at base; leaves firm, usually entire | 25–30 |
| Hoary-pubescent or hirsute; scales squarrose; stem-leaves small, linear, entire | 31, 32 |
| Scales closely imbricated, not coriaceous at base; branches divaricate; heads many, small | 33–35 |
| Remaining species; branches erect or ascending. | |
| Stem-leaves auriculate-clasping or with winged-petiole-like base; involucre lax | 42–45 |
| Stem-leaves sessile, but rarely cordate or auriculate at base | 36–41 |

§ 1. HELIÁSTRUM. *Pappus simple, coarse and rigid, the stronger bristles somewhat clavate; scales rigid, more or less foliaceous, nearly equal.*

1. **A. paludòsus**, Ait. Stems 1° high; glabrous or nearly so; heads ½′ high, rather few, racemose or spicate; outer scales lax, foliaceous; rays purple; leaves linear, entire. — Kan. to Tex., thence to Car. and Ga.

§ 2. BIÒTIA. *Involucre obovoid-bell-shaped; the scales regularly imbricated in several rows, appressed, nearly destitute of herbaceous tips; rays* 6 – 18 (*white or nearly so*); *achenes slender; pappus slightly rigid, simple; lower leaves large, heart-shaped, petioled, coarsely serrate; heads in open corymbs.*

2. **A. corymbòsus**, Ait. *Stem slender*, somewhat zigzag; *leaves thin, smoothish, coarsely and unequally serrate with sharp spreading teeth, taper-pointed,*

ovate or ovate-lanceolate, all but the uppermost heart-shaped at the base and on slender naked petioles; *rays* 6–9. — Woodlands; common; especially northward. July, Aug. — Plant 1–2° high, with smaller heads, looser corymbs, rounder and less rigid exterior involucral scales, and thinner leaves than the next; not rough, but sometimes pubescent.

3. **A. macrophýllus,** L. *Stem stout and rigid* (2–3° high); *leaves thickish, rough, closely serrate,* abruptly pointed; the lower heart-shaped (4–10′ long, 3–6′ wide), long-petioled; the upper ovate or oblong, sessile or on margined petioles; heads in ample rigid corymbs; *rays* 10–15 (white or bluish). — Moist woods; common northward, and southward along the mountains. Aug., Sept. — Involucre ½′ broad; the outer scales rigid, oblong or ovate-oblong, the innermost much larger and thinner.

§ 3. ASTER proper. *Scales imbricated in various degrees, with herbaceous or leaf-like summits, or the outer entirely foliaceous; rays numerous; pappus simple, soft and nearly uniform (coarser and more rigid in the first group); achenes flattened.* (All flowering late in summer or in autumn.)

∗ 1. *Scales well imbricated, coriaceous, with short herbaceous mostly obtuse spreading tips; pappus of rigid bristles; stem-leaves all sessile, none heart-shaped or clasping; heads few, or when several corymbose, large and showy.*

+ *Lowest leaves ovate or ovate-oblong, some rounded or subcordate at base.*

4. **A. Hervèyi,** Gray. Slightly scabrous, 1–2° high, the summit and peduncles glandular-puberulent; leaves roughish, obscurely serrate, the lower ovate on nearly naked petioles, the upper lanceolate; heads loosely corymbose, ½′ high; involucre nearly hemispherical, the scales obscurely glandular, all erect, with very short or indistinct green tips; rays violet, ½′ long. — Borders of oak woods, in rather moist soil, E. Mass. and R. I.; Mt. Desert. An ambiguous species, approaching the last.

+ + *Radical leaves all tapering into margined petioles; involucres squarrose (hardly so in* n. 8); *rootstocks slender.*

5. **A. spectábilis,** Ait. Stems 1–2° high, roughish and glandular-puberulent above; leaves oblong-lanceolate, or the lower spatulate-oblong, obscurely serrate or the upper entire; heads few, hemispherical, ½′ high; *scales glandular-puberulent and viscid;* mostly with the *upper half herbaceous and spreading;* rays about 20, bright violet, nearly 1′ long. — Sandy soil, Mass. to Del., near the coast, and perhaps southward. Sept.–Nov. One of the handsomest species of the genus.

6. **A. surculòsus,** Michx. Stems 1° high or less, *from long filiform rootstocks; leaves entire* or nearly so, *rigid,* lanceolate or the upper linear; *heads* few or solitary, as in the last but generally *smaller,* the *scales hardly glandular.* — Moist ground, coast of N. J., and southward.

7. **A. grácilis,** Nutt. Rootstocks occasionally tuberous-thickened; stems slender, 1° high; leaves oblong-lanceolate, entire or nearly so, small (1–2′ long); heads few or several; involucre top-shaped, 3–4″ long, glabrous, not glandular nor viscid, the *coriaceous whitish scales with very short deltoid or ovate tips;* rays 9–12, 3–6″ long. — Pine barrens, N. J. to N. C., E. Ky. and Tenn.

8. **A. rádula,** Ait. Stem simple or corymbose at the summit, smooth or sparsely hairy, many-leaved (1–3° high); *leaves oblong-lanceolate, pointed,*

*sharply serrate in the middle, very rough both sides and rugose-veined,* closely sessile (2 – 3′ long), nearly equal; *scales of the bell-shaped involucre oblong, appressed, with very short and slightly spreading herbaceous tips;* achenes smooth. — Bogs and low grounds, Del. to Maine and northward, near the coast; also Pocono Mountain, Penn. A dwarf form (var. STRÍCTUS, Gray) has oblong- to linear-lanceolate nearly entire leaves, and usually solitary heads; White Mountains, N. H., to Lab. Aug. — Rays light violet. Involucre nearly smooth, except the ciliate margins.

∗ 2. *Involucre and usually the branchlets viscidly or pruinose-glandular, well imbricated or loose; pubescence not silky; leaves entire (or the lower with few teeth), the cauline all sessile or clasping; rays showy, violet to purple.*

+ *Heads small; involucre not squarrose. Extreme western.*

9. **A. Féndleri,** Gray. Rigid, 1° high or less; leaves firm, linear, 1-nerved, hispid-ciliate, 1′ long or mostly much less; heads scattered, 3″ high; scales linear-oblong, obtuse, or the inner acute. — Central Kan. (Ellis, *Dr. L. Watson*) and southwestward.

+ + *Heads larger; involucral scales spreading, in few or many ranks.*

10. **A. grandiflòrus,** L. *Rough with minute hispid hairs;* stems slender, loosely much branched (1 – 3° high); *leaves very small* (¼ – 1′ long), oblong-linear, obtuse, rigid, the uppermost passing into scales of the hemispherical squarrose many-ranked involucre; rays bright violet (1′ long); achenes hairy. — Dry open places, Va. and southward. — Heads large and very showy.

11. **A. oblongifòlius,** Nutt. *Minutely glandular-puberulent,* much branched above, rigid, paniculate-corymbose (1 – 2° high); *leaves narrowly oblong or lanceolate,* mucronate-pointed, partly clasping, thickish (1 – 2′ long by 2 – 5″ wide); involucral scales nearly equal, broadly linear, appressed at the base; rays violet-purple; achenes canescent. — Banks of rivers, from Penn. and Va. to Minn. and Kan. — Heads middle-sized or smaller.

Var. **rigídulus,** Gray. Low, with more rigid and hispidulous scabrous leaves. — In drier places, Ill., Wisc., and southwestward.

12. **A. Nòvæ-Ángliæ,** L. *Stem stout, hairy* (3 – 8° high), corymbed at the summit; *leaves very numerous, lanceolate, entire, acute, auriculate-clasping, clothed with minute pubescence,* 2 – 5′ long; *scales nearly equal, linear-awl-shaped, loose, glandular-viscid,* as well as the branchlets; rays violet-purple (in var. RÒSEUS rose-purple), very numerous; achenes hairy. — Moist grounds; common. — Heads large. A peculiar and handsome species.

13. **A. modéstus,** Lindl. Pubescent or glabrate; stem slender, simple, with few large heads terminating slender branchlets; leaves lanceolate, very acute, narrowed to a sessile base, sparingly serrate or serrulate; scales linear-attenuate, equal, mostly herbaceous; rays blue. — N. Dak. and westward.

∗ 3. *Leaves whitened, silvery-silky both sides, all sessile and entire, mucronulate; involucre imbricated in* 3 *to several rows; rays showy, purple-violet.*

14. **A. serìceus,** Vent. Stems slender, branched; leaves silver-white, lanceolate or oblong, *heads mostly solitary,* terminating the short branchlets; *scales of the globular involucre similar to the leaves, spreading,* except the short coriaceous base; *achenes smooth,* many-ribbed. — Prairies and dry banks, Wisc. and Minn. to Ky., and southward. — Heads large; rays 20 – 30.

15. **A. cóncolor,** L. Stems wand-like, nearly simple; *leaves crowded, oblong or lanceolate, appressed,* the upper reduced to little bracts; *heads in a simple or compound wand-like raceme;* scales of the obovoid involucre closely imbricated in several rows, appressed, rather rigid, silky, lanceolate; *achenes silky.* — Dry sandy soil near the coast, R. I., N. J., and southward. — Plant 1–3° high, with the short leaves 1′ or less in length, grayish-silky both sides.

* 4. *Leaves entire, the lower not heart-shaped, the cauline all with sessile and cordate-clasping base, the auricles generally meeting around the stem.*

16. **A. pàtens,** Ait. Rough-pubescent; stem loosely panicled above (1–3° high), with widely spreading branches, the heads mostly solitary, terminating slender branchlets; leaves oblong-lanceolate or ovate-oblong, often contracted below the middle, rough, especially above and on the margins; scales of the minutely roughish involucre with spreading pointed tips; achenes silky. — Var. PHLOGIFÒLIUS, Nees, is a form of shady moist places, with larger and elongated thin scarcely rough leaves, downy underneath, sometimes a little toothed above, mostly much contracted below the middle. — Dry ground; common, Mass. to Minn., and southward. Heads ½′ broad, with showy deep blue-purple rays.

* 5. *Lower leaves heart-shaped and petioled; no glandular or viscid pubescence; heads with short and appressed green-tipped scales* (*except in* n. 17 *and* 24), *mostly small and numerous, racemose or panicled.*

+ *Heads middle-sized, with many rays, and squarrose foliaceous involucre.*

17. **A. anómalus,** Engelm. Somewhat pubescent and scabrous; stems slender (2–4° high), simple or racemose-branched above; leaves ovate or ovate-lanceolate, pointed, entire, the upper small and almost sessile; scales of the hemispherical involucre imbricated in several rows, appressed, with linear spreading leafy tips; achenes smooth. — Limestone cliffs, W. Ill. and Mo. to Ark. — Rays violet-purple.

+ + *Rays* 10–20; *involucral scales appressed or erect.*

++ *Leaves entire or slightly serrate; heads middle-sized; rays bright-blue.*

18. **A. azùreus,** Lindl. Stem rather rough, erect, racemose-compound at the summit, the branches slender and rigid; *leaves rough, the lower ovate-lanceolate or oblong, heart-shaped, on long often hairy petioles; the others lanceolate or linear, sessile,* on the branches awl-shaped; involucre inversely conical. — Copses and prairies, western N. Y., and Ohio to Minn., and southwestward. Involucre much as in A. lævis, but smaller and slightly pubescent.

19. **A. Shórtii,** Hook. Stem slender, spreading, nearly smooth, bearing very numerous heads in racemose panicles; *leaves smooth above, minutely pubescent underneath, lanceolate or ovate-lanceolate, elongated,* tapering gradually to a sharp point, *all but the uppermost more or less heart-shaped at base, and on naked petioles,* none clasping; involucre bell-shaped. — Cliffs and banks, Ohio to Ill., and southward. — A pretty species, 2–4° high; leaves 3–5′ long.

20. **A. undulàtus,** L. Pale or somewhat hoary with close pubescence; stem spreading, bearing numerous heads in racemose panicles; *leaves ovate or ovate-lanceolate, with wavy or slightly toothed margins, roughish above, downy underneath,* the lowest heart-shaped on margined petioles, the others *abruptly contracted into short broadly winged petioles which are dilated and clasping at the*

*base*, or directly sessile by a heart-shaped base; involucre obovoid, the scales less rigid. — Dry copses; common.

++ ++ *Leaves conspicuously serrate; heads small; rays pale blue or nearly white.*

21. **A. cordifòlius,** L. Stem much branched above, *the spreading or diverging branches bearing very numerous panicled heads;* lower leaves all heart-shaped, on slender and mostly naked ciliate petioles; *scales of the inversely conical involucre all appressed and tipped with very short green points, obtuse or acutish.* — Woodlands; very common. — Heads profuse, but quite small. Varies with the stem and leaves either smooth, roughish, or sometimes hairy, also with the leaves all narrower. Apparent hybrids with n. 35 also occur.

22. **A. sagittifòlius,** Willd. Stem rigid, erect, with *ascending branches bearing numerous racemose heads;* leaves ovate-lanceolate, pointed; the lower heart-shaped at base, on margined petioles; the upper lanceolate or linear, pointed at both ends; *scales of the oblong involucre linear, tapering into awl-shaped slender and loose tips.* — Dry ground, N. Y. and Penn. to Ky., and northward. — Green, but usually more or less hairy or downy; the heads rather larger than in the last, almost sessile.

23. **A. Drummóndii,** Lindl. Pale with fine gray pubescence; *leaves cordate to cordate-lanceolate, mostly on margined petioles,* the uppermost lanceolate and sessile; *scales acute or acutish.* — Passing into the last. Open ground, etc., Ill. to Minn. and Kan.

24. **A. Lindleyànus,** Torr. & Gray. Rather stout, 1 – 2° high, sparsely pubescent or nearly glabrous; *radical and lowest leaves ovate, moderately or obscurely cordate,* the uppermost sessile and pointed at both ends; *heads larger,* rather few in a loose thyrse or panicle, *the linear-attenuate scales looser and less imbricated;* rays pale violet. — Lab. to L. Superior; Lisbon, N. H. (*C. E. Faxon*), and Mt. Desert (*Rand*).

* 6. *Without heart-shaped petioled leaves, the radical and lower all acute or attenuate at base; not glandular nor viscid, nor silky-canescent.*

+ *Smooth and glabrous throughout (or nearly so, except forms of* n. 30), *and usually pale and glaucous; involucral scales closely imbricated, firm and whitish-coriaceous below, green-tipped; leaves firm, usually entire.*

++ *Rays violet or blue; scales rather abruptly green-tipped; leaves on the branchlets reduced to rigid subulate bracts.*

25. **A. turbinéllus,** Lindl. Stem slender, 3° high, paniculately branched; leaves oblong to narrowly lanceolate, tapering to each end, with rough margins; *involucre elongated-obconical* or almost club-shaped (½′ long); the scales linear, with very short and blunt green tips; rays violet-blue; achenes nearly smooth. — Dry hills, etc., Ill., Mo., and southwestward. — Well-marked and handsome.

26. **A. lævis,** L. Stouter, 2 – 4° high; heads in a close panicle; leaves thickish, lanceolate or ovate-lanceolate, chiefly entire, the upper more or less clasping by an auricled or heart-shaped base; scales of the *short-obovoid or hemispherical involucre* with short abrupt green tips; rays sky-blue; achenes smooth. — Borders of woodlands; common. A variable and elegant species.

27. **A. virgàtus,** Ell. Slender, strict and simple, with few or several *racemose or terminal heads,* like those of the last; *leaves lanceolate or linear, the lower usually long and narrow.* — S. W. Va., and southward.

28. **A. concínnus,** Willd. Not glaucous, slender, 1–3° high; leaves lanceolate, mostly somewhat serrate, the lowest spatulate-lanceolate on winged petioles; *heads smaller* than in the preceding, *numerous, panicled;* rays violet. — Rare; Penn. and southward.

++ ++ *Rays white or turning purplish; scales narrow, subulately green-tipped; leaves mostly narrow, narrowed at base, on the branchlets lax and attenuate.*

29. **A. polyphýllus,** Willd. Often tall (4 or 5° high), with virgate branches; cauline leaves narrowly lanceolate or linear, 4 or 5′ long; heads paniculate; scales lanceolate-subulate, the outermost much shorter; rays 4″ long. — N. Vt. to Wisc., and southward. Heads larger and flowering earlier than the next.

30. **A. ericoìdes,** L. Smooth or sparingly hairy (1–3° high); the simple branchlets or peduncles racemose along the upper side of the wand-like spreading branches; lowest leaves oblong-spatulate, sometimes toothed; the others linear-lanceolate or linear-awl-shaped; heads 3″ high or less; involucral scales often nearly equal, with attenuate or awl-shaped green tips. — Dry open places, S. New Eng. to Minn., and southward. — Var. VILLÒSUS, Torr. & Gray, is a hairy form, often with broader leaves; chiefly in the Western States. — Var. PUSÍLLUS, Gray, is a dwarf slender and glabrous form of the barrens of Lancaster, Penn. (*Porter*), with very narrow or filiform leaves and very small few-flowered heads. — Var. PRÍNGLEI, Gray, a low strict form, with few erect branches and rather small heads. About Lake Champlain.

+ + *Hoary-pubescent or hirsute; herbaceous tips of the involucral scales squarrose or spreading; cauline leaves small, linear, entire, scarcely narrowed at the sessile or partly clasping base: heads numerous, small, racemose.*

31. **A. amethýstinus,** Nutt. Tall (2–5° high), upright, much branched, puberulent or somewhat hirsute; leaves not rigid; heads 3″ high, the tips of the scales merely spreading; rays light clear blue. — Moist grounds, E. Mass. to Ill. and Iowa. With the habit of n. 11.

32. **A. multiflòrus,** Ait. Pale or hoary with minute close pubescence (1° high), much branched and bushy; the heads much crowded on the spreading racemose branches; leaves rigid, crowded, spreading, with rough or ciliate margins, the uppermost passing into the spatulate obtuse scales; heads 2–3″ long; rays white or rarely bluish, 10–20. — Dry sandy soil; common.

+ + + *Scales glabrous, closely imbricated (the outer regularly shorter), not coriaceous, with short appressed green tips; branches slender, divaricate or divergent; leaves lanceolate to subulate; heads small (2–3″ high) and numerous.*

++ *Heads scattered, terminating minutely foliose slender branchlets.*

33. **A. dumòsus,** L. Smooth or nearly so, 1–3° high; leaves linear or the upper oblong, crowded, entire, with rough margins; scales linear-spatulate, obtuse, in 4–6 rows. — Thickets; common. — A variable species, loosely branched, with small leaves, especially the upper, and an obconical or bell-shaped involucre, with more abrupt green tips than any of the succeeding. Rays pale purple or blue, larger than in n. 34. Runs into several peculiar forms.

++ ++ *Heads racemosely unilateral upon very short minutely leafy branchlets.*

34. **A. vimíneus,** Lam. *Smooth or smoothish,* 2–5° high, bushy; leaves linear or narrowly lanceolate, elongated, the larger ones remotely serrate in

the middle with fine sharp teeth; *scales of the involucre narrowly linear, acute or acutish*, in 3 or 4 rows. (A. Tradescanti, of previous ed.) — Var. FOLIOLÒSUS, Gray, has linear entire leaves, the ascending branches with more scattered paniculate heads. — Moist banks; very common. — Heads very numerous, and usually crowded, smaller than in the last. Rays white or nearly so.

35. **A. diffùsus,** Ait. *More or less pubescent*, much branched; *leaves* lanceolate or oblong-lanceolate, tapering or pointed at each end, *sharply serrate in the middle; scales of the involucre linear, acute or rather obtuse*, imbricated in 3 or 4 rows. (A. miser, of previous ed.) — Thickets, fields, etc.; very common, and extensively variable. Leaves larger than in either of the preceding (2 – 5′); the involucre intermediate between them, as to the form of the scales. Rays mostly short, white or pale bluish-purple. — Var. THYRSOÍDEUS, Gray, with ovate-oblong to lanceolate leaves, the branches ascending and often short, and the thyrsoid or spicate-glomerate heads less secund. N. Y. to Ill. — Var. HIRSUTICAÙLIS, Gray, the slender stem and the midveins of the long narrow leaves very hirsute. N. Y. and Ky. — Var. BÍFRONS, Gray, a luxuriant form with large thin leaves and rather larger heads loosely disposed on the spreading branches. Ky. to Ill.

+ + + + *Involucre various, the heads when numerous densely or loosely paniculate on erect or ascending branches.*

++ *Cauline leaves sessile, but the base not cordate nor auriculate (except in forms of* n. 41), *nor winged-petiole-like; glabrous or nearly so.*

= *Heads small or middle-sized; scales narrow, in several lengths, the erect green tips not dilated.*

36. **A. Tradescánti,** L. Stem much branched (2 – 4° high); the numerous heads (2 – 3″ high) somewhat panicled or racemed; leaves lanceolate to linear, tapering to a long slender point (2 – 6′ long), the lower somewhat serrate in the middle; involucral scales linear, acutish, partly green down the back. (A. tenuifolius, previous ed.) — Low grounds, Mass. to Minn., and south to Va. and Ill. Rays short and narrow, white or purplish. Some forms approach n. 32 – 34, others differ from A. paniculatus only in the smaller heads and shorter ray.

37. **A. paniculàtus,** Lam. Stem (2 – 8° high) much branched; the branches and scattered heads (about 4″ high) loosely paniculate; leaves long-oblong to narrowly lanceolate, pointed, the lower serrate; scales narrowly linear, with attenuate green tips or the outermost wholly green. (A. simplex, previous ed.) — Shady moist banks; common. Rays white or purplish, 3 – 4″ long. Approaches in its different forms the preceding and the two following. A slender form with linear leaves, in northern bogs, resembles n. 40.

38. **A. salicifòlius,** Ait. Like the last; the leaves commonly shorter, firmer, often scabrous, less serrate or entire; involucre more imbricated, the firmer linear scales with shorter acute or obtusish green tips; heads as large, disposed to be thyrsoid or racemose-clustered; rays rarely white. (A. carneus, previous ed.) — Low grounds, N. Eng. to Minn., and southward; most abundant westward. — Var. SUBÁSPER, Gray, a rigid scabrous form, with contracted leafy inflorescence, the broad heads usually leafy-bracteate and the broader scales often obtuse. Ill. to Tex.

= = *Heads small or middle-sized, the looser linear scales somewhat equal and erect, and the acute green tips not dilated, the outer often wholly herbaceous.*

39. **A. júnceus,** Ait. Slender, 1–3° high, simple with few heads or loosely branching; leaves linear or narrow, 3–5′ long, entire or the lower sparsely denticulate; heads small (3″ high); scales small, narrow, in 2 or 3 rows, the outer more or less shorter; rays light purple, 4–5″ long. (A. æstivus, previous ed., mainly.) — Wet meadows and cold bogs, N. Scotia and N. Y. to Mich. and Minn.

40. **A. longifòlius,** Lam. (not of previous ed.) Stem 1–3° high, more or less branched and corymbosely panicled; leaves long-lanceolate to linear-lanceolate (3–7′ long), narrowed to both ends, entire or sparsely serrulate; heads 4–5″ high, the scales nearly equal and usually little imbricated, the outer looser; rays 3–4″ long, violet or purplish, rarely whitish. — Low grounds, Lab. and northern N. Eng. to Minn. — Var. VILLICAÙLIS, Gray, a low simple form, with few or solitary heads, and the stem and midrib of the leaves densely white-villous beneath. N. Maine, at Fort Kent (*Miss Furbish*).

= = = *Heads middle-sized; scales in few to several rows, more or less unequal, linear to spatulate, more herbaceous and firmer, the tips often slightly spreading or squarrose.*

41. **A. Nòvi-Bélgii,** L. Rarely tall; leaves oblong to linear-lanceolate, entire or sparsely serrate, the upper partly clasping and often somewhat auriculate; heads 4–5″ long; rays bright blue-violet. (A. longifolius, previous ed.) — N. Brunswick to Ill. and Ga. The commonest late-flowered Aster of the Atlantic border, and very variable. The typical form has thin narrowly to oblong-lanceolate leaves, sometimes scabrous above, and linear scales with narrow acute spreading or recurved tips. — Var. LÆVIGÀTUS, Gray, is usually glabrous throughout, the thin leaves mostly oblong-lanceolate, the upper half-clasping by an abrupt base; scales nearly equal, loosely erect, with short acutish tips. N. Eng. and eastward. — Var. LITÒREUS, Gray, rigid, usually low, very leafy; leaves thickish, usually very smooth, oblong to lanceolate, the upper sometimes auriculate; scales in several loose rows, all but the innermost with broadish obtuse tips, the outer usually spatulate. Salt-marshes and shores, Can. to Ga. — Var. ELÒDES, Gray, slender, often low and simple; leaves thickish, long, narrowly linear, entire, the uppermost small and bract-like; scales narrow, with short and mostly spreading acutish tips. Swamps, N. J. to Va.

++ ++ *Cauline leaves conspicuously contracted into a winged-petiole-like base or auriculate-clasping; involucre lax.*

42. **A. pátulus,** Lam. Glabrous or subpubescent, 1–4° high; leaves ovate- or oblong-lanceolate, sharply serrate in the middle, narrowed at both ends, the lower to a winged petiole, none auriculate or only obscurely so; heads loosely panicled, about 4″ high; scales unequal, erect or nearly so; rays light purple or white. — N. Brunswick and eastern N. England.

43. **A. tardiflòrus,** L. Glabrous or stem somewhat pubescent (not hispid), 1–2° high; leaves lanceolate or oblong-lanceolate, acuminate, mostly with gradually narrowed and somewhat auricled base; heads often few, corymbose, 4–5″ high; scales subequal, the outer foliaceous; rays pale violet. — Lab. to the Mass. coast and White Mts. Not late-flowering.

44. **A. prenanthoides,** Muhl. Stem 1 – 3° high, corymbose-panicled, hairy above in lines; leaves rough above, smooth underneath, ovate-lanceolate, sharply cut-toothed in the middle, conspicuously taper-pointed, and rather abruptly narrowed to a long contracted entire portion, which is abruptly dilated into a conspicuously auricled base; heads mostly 4″ high, on short divergent peduncles; scales narrowly linear, tips recurved-spreading; rays light blue. — Borders of streams and rich woods, W. New Eng. to Penn., Iowa, and Wisc.

45. **A. puníceus,** L. Stem tall and stout 3 – 7° high, rough-hairy all over or in lines, usually purple below, panicled above; leaves oblong-lanceolate, not narrowed or but slightly so to the auricled base, coarsely serrate to sparingly denticulate in the middle, rough above, nearly smooth beneath, pointed; heads 4 – 6″ high, subsessile; scales narrowly linear, acute, loose, equal, in about 2 rows; rays long and showy (lilac-blue, paler in shade). — Low thickets and swamps, very common. — Var. LÆVICAÙLIS, Gray; stem mostly green, smooth and naked below, sparsely hirsute above, 1 – 3° high; leaves serrate. — Var. LUCÍDULUS, Gray; the very leafy stems glabrous or sparingly hispidulous; leaves lanceolate, entire or slightly denticulate, glabrous and somewhat shining; heads usually numerous, the scales less loose and less attenuate.

§ 4. DŒLLINGÈRIA. *Pappus manifestly double, the inner of long capillary bristles (some thickened at top), the outer of very short and rigid bristles; scales short, without herbaceous tips; heads small, corymbose or solitary; rays rather few, white; leaves not rigid, veiny.*

46. **A. umbellàtus,** Mill. Smooth, leafy to the top (2 – 7° high); *leaves lanceolate, elongated, taper-pointed* and tapering at the base (3 – 6′ long); heads very numerous in compound flat corymbs; involucral scales rather close, obtusish, scarcely longer than the achenes. (Diplopappus umbellatus, *Torr. & Gray.*) — Moist thickets; common, especially northward. Aug. — Var. PÙBENS, Gray; the lower surface of the leaves and the branchlets tomentulose. Upper Mich. to Minn. — Var. LATIFÒLIUS, Gray; with shorter leaves ovate-lanceolate to ovate, less narrowed or even rounded at base. (D. amygdalinus, *Torr. & Gray.*) Pine barrens, etc., N. J., Penn., and southward.

47. **A. infírmus,** Michx. Stem slender, often flexuous, 1 – 3° high, less leafy, bearing few or several heads on divergent peduncles; leaves obovate to ovate or oblong-lanceolate, narrowed at base and ciliate, the midrib hairy beneath; scales more imbricated, thicker and more obtuse; pappus more rigid. (D. cornifolius, *Darl.*) — Open woodlands, E. Mass. to Tenn., and southward.

§ 5. IÁNTHE. *Pappus less distinctly double, the inner of bristles not thickened at top, the outer shorter; scales well imbricated, appressed, without herbaceous tips; rays violet; achenes narrow, villous; leaves numerous, rigid, small, linear, 1-nerved and veinless.*

48. **A. linariifòlius,** L. Stems 3 – 20′ high, several from a woody root; heads solitary or terminating simple branches, rather large; leaves about 1′ long, rough-margined, passing above into the rigid acutish scales. (D. linariifolius, *Hook.*) — Dry soil, common. Sept., Oct. Ray rarely white.

§ 6. ORTHÓMERIS. *Pappus simple. scales imbricated, appressed, without herbaceous tips, often scarious-edged or dry. Perennial, as all the preceding.*

49. **A. ptarmicoìdes,** Torr. & Gray. Smooth or roughish; stems clustered (6 – 20′ high), simple; *leaves linear-lanceolate, acute, rigid,* entire, tapering to the base, 1 – 3-nerved, with rough margins (2 – 4′ long); *heads small, in a flat corymb;* scales imbricated in 3 or 4 rows, short; *rays white* (2 – 4″ long). — Dry rocks, W. New Eng. to Minn., along the Great Lakes, and northward. Aug. — Var. LUTÉSCENS, Gray; rays small, pale yellow. — N. Ill. and Sask.

50. **A. acuminàtus,** Michx. Somewhat hairy; stem (about 1° high) simple, zigzag, panicled-corymbose at the summit; peduncles slender; *leaves oblong-lanceolate, conspicuously pointed, coarsely toothed* above, wedge-form and entire at the base; involucral scales few and loosely imbricated, linear-lanceolate, pointed, thin (3 – 5″ long); heads few or several; rays 12 – 18, white, or slightly purple. — Cool rich woods; S. Lab. to Penn., and southward along the Alleghanies. Aug. — There is a depauperate narrow-leaved variety on the White Mountains. A monstrous form occurs in Maine, having a chaffy receptacle and the flowers turned to tufts of chaffy paleæ.

51. **A. nemoràlis,** Ait. Minutely roughish-pubescent; stem slender, simple or corymbose at the summit, very leafy (1 – 2° high); *leaves* small (1 – 1½′ long), rather *rigid, lanceolate,* nearly *entire, with revolute margins;* scales of the inversely conical involucre narrowly linear-lanceolate, the outer passing into awl-shaped bracts; rays lilac-purple, elongated. — Bogs and swamps, N. J. to Newf. and Hudson's Bay. Sept.

52. **A. tenuifòlius,** L. Very glabrous; stem often zigzag, simple or forked, 6′ – 2° high; heads rather large, terminal; *leaves few, long-linear, tapering to both ends, rather thick and fleshy, entire,* the upper subulate, pointed; involucre top-shaped, the scales subulate-lanceolate with attenuate acute points; rays large, numerous, pale purple. (A. flexuosus, *Nutt.*) — Salt marshes, Mass. to Fla. Sept.

§ 7. OXYTRIPÒLIUM. *Involucre as in* § 6; *pappus simple, fine and soft; glabrous annuals, bearing numerous small heads and with narrow entire leaves.*

53. **A. subulàtus,** Michx. Stem 6 – 24′ high; leaves linear-lanceolate, pointed, flat, on the branches awl-shaped; scales of the oblong involucre linear-awl-shaped, in few rows; rays somewhat in two rows, short, not projecting beyond the disk, more numerous than the disk-flowers, purplish. (A. linifolius, of previous ed.) — Salt marshes on the coast, Maine to Va. Aug. – Oct.

§ 8. CONYZÓPSIS. *Scales of the campanulate involucre in* 2 *or* 3 *rows, nearly equal, linear, the outer foliaceous and loose; pappus copious, very soft; rays very short or without ligules; low annuals with numerous rather small heads.*

54. **A. angústus,** Torr. & Gray. Branching, 6 – 20′ high, nearly glabrous; leaves linear, entire, more or less short-ciliate; ray-flowers reduced to a tube much shorter than the elongated style. — Minn. to Sask. and westward, spreading east to Chicago, etc. (Siberia.)

## 26. ERÍGERON, L. FLEABANE.

Heads many-flowered, radiate, mostly flat or hemispherical; the narrow rays very numerous, pistillate. Involucral scales narrow, equal and little imbricated, never coriaceous, foliaceous, nor green-tipped. Receptacle flat or convex, naked. Achenes flattened, usually pubescent and 2-nerved; pappus a single row of capillary bristles, with minuter ones intermixed, or with a distinct short outer pappus of little bristles or chaffy scales. — Herbs, with entire or toothed and generally sessile leaves, and solitary or corymbed naked-pedunculate heads. Disk yellow; ray white or purple. (Name from ἦρ, *spring*, and γέρων, *an old man*, suggested by the hoariness of some vernal species.)

§ 1. CÆNÒTUS. *Rays inconspicuous, in several rows, scarcely longer than the pappus; pappus simple; annuals.*

1. **E. Canadénsis,** L. (Horse-weed. Butter-weed.) Bristly-hairy; *stem erect, wand-like* (1 – 5° high); leaves linear, mostly entire, the radical cut-lobed; *heads* very numerous and small, cylindrical, *panicled.* — Waste places; a common weed, now widely diffused over the world. July – Oct. — Ligule of the ray-flowers much shorter than the tube, white.

2. **E. divaricàtus,** Michx. *Diffuse and decumbent* (3′ – 1° high); leaves linear or awl-shaped, entire; *heads loosely corymbed; rays purple;* otherwise like n. 1. — Ind. to Minn., and southward.

§ 2. TRIMORPHÆA. *Like* § 1, *but a series of filiform rayless pistillate flowers within the outer row of ray-flowers; biennial or sometimes perennial.*

3. **E. àcris,** L. Hirsute-pubescent or smoothish; stem erect (10 – 20′ high); leaves lanceolate or the lower spatulate-oblong, entire; heads several or rather numerous, racemose or at length corymbose, nearly hemispherical (4 – 5″ long), hirsute; rays purplish or bluish, equalling or a little exceeding the copious pappus. — Lower St. Lawrence, across the continent and northward. The var. Drœbachénsis, Blytt, more glabrous and with the green involucre nearly or quite naked, occurs on the shores of L. Superior. (Eu.)

§ 3. ERIGERON proper. *Rays elongated* (*short in a form of* n. 5), *crowded in one or more rows.*

* *Annuals* (*or sometimes biennial*), *leafy-stemmed and branching; pappus double, the outer a crown of minute scales, the inner of deciduous fragile bristles, usually wanting in the ray.*

4. **E. ánnuus,** Pers. (Daisy Fleabane. Sweet Scabious.) Stem stout (3 – 5° high), branched, *beset with spreading hairs; leaves coarsely and sharply toothed; the lowest ovate,* tapering into a margined petiole, the upper ovate-lanceolate, acute and entire at both ends; heads corymbed; rays white, tinged with purple, not twice the length of the bristly involucre. — Fields and waste places; a very common weed. June – Aug. (Nat. in Eu.)

5. **E. strigòsus,** Muhl. (Daisy Fleabane.) Stem panicled-corymbose at the summit, *roughish* like the leaves *with minute appressed hairs, or almost smooth; leaves entire* or nearly so, the upper *lanceolate,* scattered, the lowest oblong or spatulate, tapering into a slender petiole; rays white, twice the length of the minutely hairy involucre. — Fields, etc., common. June – Aug. — Stem smaller and more simple than the last, with smaller heads but longer rays. A form with the rays minute, scarcely exceeding the involucre, occurs in S. New England.

* * *Leafy-stemmed perennials; pappus simple* (*double in* n. 6).

6. **E. glabéllus,** Nutt. Stem (6 – 15′ high) stout, hairy above, the leafless summit bearing 1 – 7 large heads; leaves nearly glabrous, except the

margins, entire, the upper oblong-lanceolate and pointed, closely sessile or partly clasping, the lower spatulate and petioled; rays (more than 100, purple) more than twice the length of the hoary-hispid involucre; pappus double, the outer of minute bristles. — Plains of N. Wisc., and westward. June.

7. **E. hyssopifòlius,** Michx. Slightly pubescent, slender (6 - 12′ high), from filiform rootstocks; leaves short, very numerous, narrowly linear; branches prolonged into slender naked peduncles, bearing solitary small heads; rays 20 - 30, rose-purple or whitish. (Aster graminifolius, *Pursh.*) — Northern borders of N. Eng., L. Superior, and northward.

8. **E. bellidifòlius,** Muhl. (Robin's Plantain.) Hairy, *producing offsets from the base; stem simple, rather naked above,* bearing few (1 - 9) large heads on slender peduncles; root-leaves obovate and spatulate, sparingly toothed, the cauline distant, lanceolate-oblong, partly clasping, entire; *rays* (*about* 50) *rather broad, light bluish-purple.* — Copses and moist banks; common. May.

9. **E. Philadélphicus,** L. (Common Fleabane.) Hairy; *stem leafy,* corymbed, bearing several small heads; leaves thin, with a broad midrib, oblong; the upper smoothish, clasping by a heart-shaped base, mostly entire, the lowest spatulate, toothed; *rays innumerable and very narrow, rose-purple* or flesh-color. — Moist ground; common. June - Aug.

* * * *Perennial by rosulate offsets, with scape-like stems: pappus simple.*

10. **E. nudicaùlis,** Michx. Glabrous; leaves clustered at the root, oval or spatulate; scape leafless, slender (1 - 2° high), bearing 5 - 12 small corymbed heads; rays white. (E. vernum, *Torr. & Gray*). — Low grounds, E. Va. and southward. May.

## 27. BÁCCHARIS, L. Groundsel-Tree.

Heads many-flowered; the flowers all tubular, diœcious, i. e., the pistillate and staminate borne by different plants. Involucre imbricated. Corolla of the pistillate flowers very slender and thread-like; of the staminate, larger and 5-lobed. Anthers tailless. Achenes ribbed; pappus of capillary bristles, in the sterile plant scanty and tortuous; in the fertile very long and copious. — Shrubs, commonly smooth and resinous or glutinous. Flowers whitish or yellow, autumnal. (Name of some shrub anciently dedicated to *Bacchus.*)

1. **B. halimifòlia,** L. Smooth and somewhat scurfy; branches angled; leaves obovate and wedge-form, petiolate, coarsely toothed, or the upper entire; heads scattered or in leafy panicles; scales of the involucre acutish. — Sea beaches, Mass to Va., and southward. — Shrub 6 - 12° high; the fertile plant conspicuous in autumn by its very long and white pappus.

2. **B. glomeruliflòra,** Pers. Leaves spatulate-oblong, sessile or nearly so; heads larger, sessile in the axils or in clusters; scales of the bell-shaped involucre broader, very obtuse. — Pine barrens, E. Va. (?), and southward.

## 28. PLÙCHEA, Cass. Marsh-Fleabane.

Heads many-flowered; the flowers all tubular; the central perfect, but sterile, few, with a 5-cleft corolla; all the others with a thread-shaped truncate corolla, pistillate and fertile. Involucre imbricated. Receptacle flat, naked. Anthers with tails. Achenes grooved; pappus capillary, in a single row. — Herbs, somewhat glandular, emitting a strong or camphoric odor, the heads cymosely clustered. Flowers purplish, in summer. (Dedicated to the Abbé *Pluche*.)

1. **P. bífrons,** DC. *Perennial*, 2–3° high; *leaves closely sessile or half-clasping*, oblong to lanceolate, sharply denticulate, veiny (only 2–3′ long); heads clustered in a corymb; scales lanceolate. — Low ground, Cape May, N. J., and southward.

2. **P. camphoràta,** DC. (SALT-MARSH FLEABANE.) *Annual, pale* (2–5° high); *leaves scarcely petioled*, oblong-ovate or lanceolate, thickish, obscurely veiny, serrate; corymb flat; involucral scales ovate to lanceolate. (P. fœtida, *DC.*) — Salt marshes, Mass. to Va., and southward, and on river-banks westward to Ky., Ill., and Neb. (*?*)

## 29. ÈVAX, Gaertn.

Heads rather many-flowered, discoid; flowers as in Pluchea, the central usually sterile. Involucral scales few, woolly. Receptacle convex to subulate, chaffy, the scarious chaff not embracing the smooth dorsally compressed achenes. Anthers with tails or acutely sagittate; pappus none. — Low, densely floccose-woolly annuals; extreme western. (Name of uncertain signification.)

1. **E. prolífera,** Nutt. A span high or less, simple or branching from the base; leaves numerous, small and spatulate; heads in dense proliferous clusters; receptacle convex; chaff subtending the sterile flowers woolly-tipped, the rest more scarious and naked, oval or oblong. — Dak. and W. Kan. to Tex.

## 30. FILÀGO, Tourn. COTTON-ROSE.

Heads and flowers as in Evax. Receptacle elongated or top-shaped, naked at the summit, but chaffy at the margins or toward the base; the chaff resembling the proper involucral scales, each covering a single pistillate flower. Achenes terete; pappus of the central flowers capillary, of the outer ones mostly none. — Annual, low, branching woolly herbs, with entire leaves, and small heads in capitate clusters. (Name from *filum*, a thread, in allusion to the cottony hairs of these plants.)

**F. GERMÁNICA,** L. (HERBA IMPIA.) Stem erect, short, clothed with lanceolate and upright crowded leaves, producing a capitate cluster of woolly heads, from which rise one or more branches, each terminated by a similar head, and so on; — hence the common name applied to it by the old botanists, as if the offspring were undutifully exalting themselves above the parent. — Dry fields, N. Y. to Va. July – Oct. (Nat. from Eu.)

## 31. ANTENNÀRIA, Gaertn. EVERLASTING.

Heads many-flowered, diœcious; flowers all tubular; pistillate corollas very slender. Involucre dry and scarious, white or colored, imbricated. Receptacle convex or flat, not chaffy. Anthers caudate. Achenes terete or flattish; pappus a single row of bristles, in the fertile flowers capillary, united at base so as to fall in a ring, and in the sterile thickened and club-shaped or barbellate at the summit. — Perennial white-woolly herbs, with entire leaves and corymbed (rarely single) heads. Corolla yellowish. (Name from the resemblance of the sterile pappus to the *antennæ* of certain insects.)

1. **A. plantaginifòlia,** Hook. (PLANTAIN-LEAVED EVERLASTING.) Spreading by offsets and runners, low (3 – 18′ high); leaves silky-woolly when young, at length green above and hoary beneath; those of the simple and scape

like flowering stems small, lanceolate, appressed; the radical obovate or oval-spatulate, petioled, ample, 3-nerved; heads in a small crowded corymb; scales of the (mostly white) involucre obtuse in the sterile, and acutish and narrower in the fertile plant. — Sterile knolls and banks; common. March – May.

### 32. ANÁPHALIS, DC. EVERLASTING.

Characters as of Antennaria, but the pappus in the sterile flowers not thickened at the summit or scarcely so, and that of the fertile flowers not at all united at base; fertile heads usually with a few perfect but sterile flowers in the centre. (Said to be an ancient Greek name of some similar plant.)

1. **A. margaritàcea,** Benth. & Hook. (PEARLY EVERLASTING.) Stem erect (1 – 2° high), corymbose at the summit, with many heads, leafy; leaves broadly to linear-lanceolate, taper-pointed, sessile, soon green above; involucral scales pearly-white, very numerous, obtuse or rounded, radiating in age. (Antennaria margaritacea, *R. Br.*) — Dry hills and woods; common northward. Aug. (N. E. Asia.)

### 33. GNAPHÀLIUM, L. CUDWEED.

Heads many-flowered; flowers all tubular, the outer pistillate and very slender, the central perfect. Scales of the involucre dry and scarious, white or colored, imbricated in several rows. Receptacle flat, naked. Anthers caudate. Achenes terete or flattish; pappus a single row of capillary rough bristles. — Woolly herbs, with sessile or decurrent leaves, and clustered or corymbed heads; fl. in summer and autumn. Corolla whitish or yellowish. (Name from *γνάφαλον, a lock of wool,* in allusion to the floccose down.)

§ 1. GNAPHALIUM proper. *Bristles of the pappus distinct.*

1. **G. polycéphalum,** Michx. (COMMON EVERLASTING.) Erect, woolly annual (1 – 3° high), fragrant; *leaves lanceolate, tapering at the base,* with undulate margins, *not decurrent,* smoothish above; *heads clustered at the summit of the panicled-corymbose branches,* ovate-conical before expansion, then obovate; scales (whitish) ovate and oblong, rather obtuse; perfect flowers few. — Old fields and woods; common.

2. **G. decúrrens,** Ives. (EVERLASTING.) Stout, erect (2° high), annual or biennial, branched at the top, clammy-pubescent, white-woolly on the branches, bearing numerous *heads in dense corymbed clusters; leaves linear-lanceolate, partly clasping, decurrent;* scales yellowish-white, oval, acutish. — Hillsides, N. J. and Penn. to Maine, Mich., Minn., and northward.

3. **G. uliginòsum,** L. (LOW CUDWEED.) *Diffusely branched,* appressed-woolly annual (3 – 6′ high); leaves spatulate-oblanceolate or linear, not decurrent; *heads (small) in terminal sessile capitate clusters* subtended by leaves; scales brownish, less imbricated. — Low grounds; common, especially east and northward; perhaps introduced. (Eu.)

4. **G. supìnum,** Villars. (MOUNTAIN CUDWEED.) Dwarf and tufted perennial (2′ high); leaves linear, woolly; heads solitary or few and spiked on the slender simple flowering stems; scales brown, lanceolate, acute, nearly glabrous; achenes broader and flatter. — Alpine summit of Mount Washington; very rare. (Eu.)

§ 2. GAMOCHÆTA. *Bristles of the pappus united at the very base into a ring, so falling off all together.*

5. **G. purpùreum,** L. (Purplish Cudweed.) Annual, simple or branched from the base, ascending (6 – 20′ high), silvery-canescent with dense white wool; leaves oblong-spatulate, obtuse, not decurrent, green above; *heads* in sessile clusters in the axils of the upper leaves, and spiked at the wand-like summit of the stem; scales tawny, the inner often marked with purple. — Sandy or gravelly soil, coast of Maine to Va., and southward.

### 34. ADENOCAÙLON, Hook.

Heads 5 – 10-flowered; the flowers all tubular and with similar corollas; the marginal ones pistillate, fertile; the others perfect but sterile. Involucral scales few, equal, in a single row, not scarious. Receptacle flat, naked. Anthers caudate. Achenes elongated at maturity, club-shaped, beset with stalked glands above; pappus none. — Slender perennials, with the alternate thin and petioled leaves smooth and green above, white-woolly beneath, and few small (whitish) heads in a loose panicle, beset with glands (whence the name, from ἀδήν, *a gland*, and καυλός, *a stem*).

1. **A. bícolor,** Hook. Leaves triangular, rather heart-shaped, with angular-toothed margins; petioles margined. — Moist woods, shore of Lake Superior, and westward. Stem 1 – 3° high.

### 35. ÍNULA, L. Elecampane.

Heads many-flowered, radiate; disk-flowers perfect and fertile. Involucre imbricated, hemispherical, the outer scales herbaceous or leaf-like. Receptacle naked. Anthers caudate. Achenes more or less 4 – 5-ribbed; pappus simple, of capillary bristles. — Coarse herbs, not floccose-woolly, with alternate simple leaves, and large yellow flowers. (The ancient Latin name.)

**I.** Helènium, L. (Elecampane.) Stout perennial (3 – 5° high); leaves large, woolly beneath; those from the thick root ovate, petioled, the others partly clasping; rays very many, narrow. — Roadsides and damp pastures. Aug. — Heads very large. Root mucilaginous. (Nat from Eu.)

### 36. POLÝMNIA, L. Leaf-Cup.

Heads broad, many-flowered, radiate; rays several (rarely abortive), pistillate; disk-flowers perfect but sterile. Involucral scales in two rows; the outer about 5, leaf-like, large and spreading; the inner small and membranaceous, partly embracing the thick triangular-obovoid achenes. Receptacle flat, membranous-chaffy. Pappus none. — Tall branching perennial herbs, viscid-hairy, exhaling a heavy odor. Leaves large and thin, opposite, or the uppermost alternate, lobed, and with dilated appendages like stipules at the base. Heads in panicled corymbs. Flowers light yellow; in summer and autumn. (Dedicated to the Muse, *Polyhymnia*, for no obvious reason.)

1. **P. Canadénsis,** L. *Clammy-hairy*, 2 – 5° high; lower leaves deeply pinnatifid, the uppermost triangular-ovate and 3 – 5-lobed or angled, petioled; heads small; *rays 5, obovate or wedge-form, shorter than the involucre*, often minute or abortive, whitish-yellow; achenes 3-costate, not striate. — Moist shaded ravines, Conn. to W. Vt., Minn., and southward. — Var. radiàta, Gray; ligules more developed, 3-lobed, 3 – 6″ long, whitish. Ill. to Kan., and southward.

2. **P. Uvedàlia**, L. *Roughish-hairy, stout* (4 – 10° high); leaves broadly ovate, angled and toothed, nearly sessile; the lower palmately lobed, abruptly narrowed into a winged petiole; outer involucral scales very large; *rays* 10 – 15, *linear-oblong, much longer than the inner scales of the involucre*, yellow; achenes strongly striate. — Rich soil, W. New York and N. J. to Mo., and southward.

### 37. SÍLPHIUM, L. Rosin-weed.

Heads many-flowered, radiate; rays numerous, pistillate and fertile, their broad flat ovaries imbricated in 2 or 3 rows; disk-flowers apparently perfect, but with entire style and sterile. Scales of the broad and flattish involucre imbricated in several rows, thickish, broad and with loose leaf-like summits, except the innermost, which resemble the linear chaff of the flat receptacle. Achenes broad and flat, dorsally compressed, surrounded by a wing notched at the top, without pappus, or with 2 teeth confluent with the winged margin, the achene and its subtending chaff usually falling together; those of the disk sterile and stalk-like. — Coarse and tall rough perennial herbs, with copious resinous juice, and large corymbose-panicled yellow-flowered heads. (Σίλφιον, the ancient name of some resinous plant, transferred by Linnæus to this American genus.)

* *Stem terete, alternate-leaved* (*root very large and thick*).

1. **S. laciniàtum**, L. (Rosin-weed. Compass-Plant.) *Rough-bristly throughout,* stem stout (3 – 12° high), leafy; *leaves pinnately parted*, petioled but dilated and clasping at the base; *their divisions lanceolate or linear*, acute, *cut-lobed or pinnatifid*, rarely entire; heads few (1 – 2′ broad), sessile or short-peduncled along the naked summit; *scales ovate, tapering into long and spreading rigid points;* achenes broadly winged and deeply notched, 6″ long. — Prairies, Mich. to Dak., and southward. July. — Lower and root-leaves vertical, 12 – 30′ long, ovate in outline; on the wide open prairies disposed to present their edges north and south; hence called *Compass-Plant.*

2. **S. terebinthinàceum**, L. (Prairie Dock.) *Stem smooth, slender* (4 – 10° high), panicled at the summit and bearing several or many, large heads, leafless except toward the base; *leaves ovate* and ovate-oblong, somewhat heart-shaped, *serrate-toothed*, thick, rough, especially beneath (1 – 2° long, on slender petioles); *scales roundish, obtuse*, smooth; achenes narrowly winged, slightly notched and 2-toothed. — Var. pinnatífidum, Gray, has the leaves deeply cut or pinnatifid, but varies into the ordinary form. — Prairies and oak-openings, Ohio and Mich. to Minn., and southward. July – Sept.

* * *Stem terete or slightly 4-angled, leafy; leaves undivided* (*not large*), *some opposite.*

3. **S. trifoliàtum**, L. *Stem smooth, often glaucous,* rather slender (4 – 7° high), branched above; stem-*leaves lanceolate, pointed, entire* or scarcely serrate, rough, *short-petioled, in whorls of* 3 *or* 4, the uppermost opposite; heads loosely panicled; achenes rather broadly winged, and sharply 2-toothed at the top. — Dry plains and banks, Penn. to Ohio, and southward. Aug.

4. **S. Asteríscus**, L. *Stem hispid* (2 – 4° high); *leaves opposite, or the lower rarely in whorls of* 3, *the upper alternate, oblong or oval-lanceolate, coarsely toothed*, rarely entire, *rough-hairy*, the lower short-petioled; heads nearly soli-

tary (large), squarrose; achenes obovate, winged, 2-toothed, the teeth usually awn-like. — Dry sandy soil, Va. and southward.

5. **S. integrifòlium**, Michx. *Stem smooth or rough*, rather stout (2–4° high), rigid, 4-angular and grooved; *leaves all opposite, rigid, lanceolate-ovate*, entire or denticulate, tapering to a sharp point *from a roundish heart-shaped and partly clasping base*, rough-pubescent or nearly smooth, thick (3–5′ long); heads in a close forking corymb, short-peduncled; achenes broadly winged, deeply notched. — Prairies, Mich. to Minn., and southward. Aug.

* * * *Stem square; leaves opposite, connate* (*thin and large*, 6–15′ *long*).

6. **S. perfoliàtum**, L. (CUP-PLANT.) Stem stout, often branched above (4–8° high), leafy; leaves ovate, coarsely toothed, the upper united by their bases and forming a cup-shaped disk, the lower abruptly narrowed into winged petioles which are connate by their bases; heads corymbose; scales ovate; achenes winged and variously notched. — Rich soil along streams, Mich. to Minn., and southward; common. Also escaped from gardens eastward. July.

## 38. BERLANDIÈRA, DC.

With the characters of Silphium, but the 5–12 fertile ray-flowers in a single series. Involucral scales in about 3 series, thinner, the inner dilated obovate, exceeding the disk, the outer smaller and more foliaceous. Achenes obovate, not winged nor notched at the apex, and without pappus, deciduous with the subtending scale and 2 or 3 of the inner chaff. — Alternate-leaved perennials of the southern and southwestern States; head pedunculate. (Named for *J. L. Berlandier*, a Swiss botanist who collected in Texas and Mexico.)

1. **B. Texàna**, DC. Hirsute-tomentose or villous, 2–3° high, very leafy; leaves crenate, the radical oblong, petiolate, the cauline oblong-cordate to subcordate-lanceolate, the upper closely sessile; heads somewhat cymose, ½′ broad. — S. W. Mo. to La. and Tex.

## 39. CHRYSÓGONUM, L.

Heads many-flowered, radiate; the rays about 5, pistillate and fertile; the disk-flowers perfect but sterile. Involucre of about 5 outer leaf-like oblong scales, which exceed the disk, and as many interior shorter and chaff-like concave scales. Receptacle flat, with a linear chaff to each disk-flower. Achenes all in the ray, obovate, obcompressed, 4-angled, each one partly enclosed by the short scale of the involucre behind it; pappus a small chaffy crown, 2–3-toothed, and wanting on the inner side. — A hairy, perennial herb, with opposite long-petioled leaves, and solitary long-peduncled heads of yellow flowers, nearly stemless when it begins to flower, the flowerless shoots forming runners. (The Greek name of some plant, composed of *χρυσός, golden*, and *γόνυ, knee*.)

1. **C. Virginiànum**, L. Usually low (2–15′ high); leaves ovate, mostly obtuse, crenate, rarely somewhat cordate, or the radical obovate with cuneate base; rays ½′ long. — Dry soil, from southern Penn. to Fla. May–Aug. — Var. DENTÀTUM, Gray; leaves deltoid-ovate, acute, coarsely dentate-serrate; involucral scales more acute. — High Island at the Falls of the Potomac.

### 40. ENGELMÁNNIA, Torr. & Gray.

Heads and flowers of the preceding genera. Rays 8 – 10. Involucre of about 10 outer loose foliaceous scales, more or less dilated and coriaceous at base, and several firm-coriaceous, oval or obovate, concave inner ones with short abrupt green tips. Chaff of the flat receptacle firm and persistent. Achenes flat, obovate, wingless, tardily deciduous with the attached scale and chaff; pappus a firm scarious hispid crown, more or less lobed. — A coarse hispid perennial, with alternate deeply pinnatifid leaves, and somewhat paniculately disposed heads on slender naked peduncles; flowers yellow. (Named for the eminent botanist, *Dr. George Engelmann.*)

1. **E. pinnatífida,** Torr. & Gray. Stems 1 – 2° high; heads ½′ broad, and rays ½′ long. — Central Kan. to La., and westward.

### 41. PARTHÈNIUM, L.

Heads many-flowered, inconspicuously radiate; ray-flowers 5, with very short and broad obcordate ligules not projecting beyond the woolly disk, pistillate and fertile; disk-flowers staminate with imperfect styles, sterile. Involucre hemispherical, of 2 ranks of short ovate or roundish scales. Receptacle conical, chaffy. Achenes only in the ray, obcompressed, surrounded by a slender callous margin, crowned with the persistent ray-corolla and a pappus of 2 small chaffy scales. — Leaves alternate. Heads small, corymbed; the flowers whitish. (An ancient name of some plant, from *παρθένος, virgin.*)

1. **P. integrifòlium,** L. Rough-pubescent perennial (1 – 3° high); leaves oblong or ovate, crenate-toothed, or the lower (3 – 6′ long) cut-lobed below the middle; heads many in a very dense flat corymb. — Dry soil, Md. to Ill., Minn., and southward. June – Aug.

### 42. ÌVA, L. Marsh Elder. Highwater-shrub.

Heads several-flowered, not radiate; the pistillate fertile and the staminate sterile flowers in the same heads, the former few (1 – 5) and marginal, with a small tubular or no corolla; the latter with a funnel-form 5-toothed corolla. Anthers nearly separate. Scales of the involucre few, roundish. Receptacle small, with narrow chaff among the flowers. Achenes obovoid or lenticular, pappus none. — Herbaceous or shrubby coarse plants, with thickish leaves, the lower opposite, and small nodding greenish-white heads of flowers; in summer and autumn. (Name of unknown derivation.)

§ 1. *Heads spicate or racemose in the axils of leaves or leaf-like bracts; fertile flowers with evident corolla.*

1. **I. frutéscens,** L. *Shrubby at the base, nearly smooth* (3 – 8° high); leaves oval or lanceolate, coarsely and sharply toothed, rather fleshy, the upper reduced to linear bracts, in the axils of which the heads are disposed, in leafy panicled racemes; fertile flowers and scales of the involucre 5. — Salt marshes, coast of Mass. to Va. and southward.

2. **I. ciliàta,** Willd. *Annual* (2 - 6° high), *rough and hairy; leaves* ovate, pointed, coarsely toothed, *downy beneath, on slender ciliate petioles;* heads in dense spikes, with conspicuous ovate-lanceolate rough-ciliate bracts; scales of the involucre and fertile flowers 3 - 5. — Moist ground, from Ill. southward.

§ 2. CYCLACHÆNA. *Heads in panicled spikes, scarcely bracteate; corolla of the 5 fertile flowers a mere rudiment or none.*

3. **I. xanthiifòlia,** Nutt. Annual, tall, roughish; leaves nearly all opposite, hoary with minute down, ovate, rhombic, or the lowest heart-shaped, doubly or cut-toothed, or obscurely lobed; heads small, crowded, in axillary and terminal panicles. — N. W. Wisc. to Minn., Kan., and westward.

### 43. AMBRÒSIA, Tourn. RAGWEED.

Sterile and fertile flowers occupying different heads on the same plant; the fertile 1 – 3 together and sessile in the axil of leaves or bracts, at the base of the racemes or spikes of sterile heads. Sterile involucres flattish or top-shaped, of 7 – 12 scales united into a cup, containing 5 – 20 funnel-form staminate flowers, with slender chaff intermixed, or none. Anthers almost separate. Fertile involucre (fruit) oblong or top-shaped, closed, pointed, resembling an achene (usually with 4 – 8 tubercles or horns near the top in one row), and enclosing a single flower which consists of a pistil only; the elongated style-branches protruding. Achenes ovoid; pappus none. — Coarse homely weeds, with opposite or alternate lobed or dissected leaves, and inconspicuous greenish flowers, in late summer and autumn; ours annuals, except the last. (The Greek and later Latin name of several plants, as well as of the food of the gods.)

§ 1. *Sterile heads sessile in a dense spike, the top-shaped involucre extended on one side into a large, lanceolate, hooded, bristly-hairy tooth or appendage; fertile involucre oblong and 4-angled.*

1. **A. bidentàta,** Michx. Hairy (1 – 3° high), very leafy; leaves alternate, lanceolate, partly clasping, nearly entire, except a short lobe or tooth on each side near the base; fruit with 4 stout spines and a central beak. — Prairies of Ill., Mo., and southward.

§ 2. *Sterile heads in single or panicled racemes or spikes, the involucre regular.*

* *Leaves opposite, only once lobed; sterile involucre 3-ribbed on one side.*

2. **A. trífida,** L. (GREAT RAGWEED.) Stem stout (3 – 12° high), rough-hairy, as are the large deeply 3-lobed leaves, the lobes oval-lanceolate and serrate; petioles margined; fruit obovate, 5 – 6-ribbed and tubercled. — Var. INTEGRIFÒLIA, Torr. & Gray, is only a smaller form, with the upper leaves, or all of them, undivided, ovate or oval. — Moist river-banks; common.

* * *Leaves many of them alternate, all once or twice pinnatifid.*

3. **A. artemisiæfòlia,** L. (ROMAN WORMWOOD. HOG-WEED. BITTER-WEED.) Much branched (1 – 3° high), hairy or roughish-pubescent; *leaves thin, twice-pinnatifid,* smoothish above, paler or hoary beneath; *fruit* obovoid or globular, *armed with about* 6 *short acute teeth or spines.* — Waste places everywhere. — Extremely variable, with finely cut leaves, on the flowering branches often undivided; rarely the spikes bear all fertile heads.

4. **A. psilostàchya,** DC. Paniculate-branched (2 – 5° high), rough and somewhat hoary with short hispid hairs; *leaves once pinnatifid, thickish,* the lobes acute, those of the lower leaves often incised; *fruit* obovoid, *without tubercles or with very small ones,* pubescent. — Prairies and plains, Ill., Wisc., Minn., and southwestward. Perennial, with slender running rootstocks.

### 44. XÁNTHIUM, Tourn. Cocklebur. Clotbur.

Sterile and fertile flowers occupying different heads, the latter clustered below, the former in short spikes or racemes above. Sterile involucres and flowers as in Ambrosia, but the scales separate and receptacle cylindrical. Fertile involucre closed, coriaceous, ovoid or oblong, clothed with hooked prickles so as to form a rough bur, 2-celled, 2-flowered; the flower consisting of a pistil and slender thread-form corolla. Achenes oblong, flat, destitute of pappus. — Coarse and vile weeds, with annual roots, low and branching stout stems, and alternate toothed or lobed petioled leaves; flowering in summer and autumn. (The Greek name of some plant that was used to dye the hair yellow; from *ξανθός, yellow.*)

* *Leaves attenuate to both ends, with triple spines at the base.*

**X.** spinòsum, L. (Spiny Clotbur.) Hoary-pubescent; stems slender, with slender yellow 3-parted spines at the axils; leaves lanceolate or ovate-lanceolate, tapering to a short petiole, white-downy beneath, often 2 – 3-lobed or cut; fruit (⅓′ long) pointed with a single short beak. — Waste places on the sea-board and along rivers, Mass. and southward. (Nat. from Trop. Amer.)

* * *Leaves cordate or ovate, 3-nerved, dentate and often lobed, long-petiolate; axils unarmed; fruit 2-beaked.*

**X.** strumàrium, L. Low (1 – 2° high); fruit 6 – 8″ long, glabrous or puberulent, with usually straight beaks and rather slender spines. — A weed of barnyards, etc., sparingly nat. from Eu. (?) or Ind. (?).

1. **X. Canadénse,** Mill. Stouter, the stem often brown-punctate; fruit about 1′ long, densely prickly and more or less hispid, the stout beaks usually hooked or incurved. — River-banks and waste places, common. — Var. echinàtum, Gray, usually low, with still denser and longer, conspicuously hirsute or hispid prickles. Sandy sea-shores and on the Great Lakes.

### 45. TETRAGONOTHÈCA, Dill.

Heads many-flowered, radiate; the rays 6 – 9, fertile. Involucre double; the outer of 4 large and leafy ovate scales, united below by their margins into a 4-angled or winged cup; the inner of small chaffy scales, as many as the ray-flowers, and partly clasping their achenes. Receptacle convex or conical, with narrow and membranaceous chaff. Achenes very thick and obovoid, flat at the top; pappus none. — Erect perennial herbs, with opposite coarsely toothed leaves, their sessile bases sometimes connate, and large single heads of pale yellow flowers, on terminal peduncles. (Name compounded of *τετράγωνος, four-angled,* and *θήκη, a case,* from the shape of the involucre.)

1. **T. helianthoìdes,** L. Villous and somewhat viscid, 1 – 2° high, simple; leaves ovate or rhombic-oblong, sessile by a narrow base; involucral scales and rays about 1′ long. — Sandy soil, Va. and southward. June.

### 46. ECLÍPTA, L.

Heads many-flowered, radiate; rays short; disk-flowers perfect, 4-toothed, all fertile. Involucral scales 10 – 12, in 2 rows, leaf-like, ovate-lanceolate. Receptacle flat, with almost bristle-form chaff. Achenes short, 3 – 4-sided, or in the disk laterally flattened, roughened on the sides, hairy at the summit; pappus none, or an obscure denticulate crown. — An annual rough herb, with slender stems and opposite leaves. Heads solitary, small. Flowers white; anthers brown. (Name from *ἐκλείπω, to be deficient*, alluding to the absence of pappus.)

1. **E. álba,** Hassk. Rough with fine appressed hairs; stems procumbent, or ascending and 1–3° high; leaves lanceolate or oblong, acute at each end, mostly sessile, slightly serrate; rays equalling the disk. (E. procumbens, *Michx.*) — Wet river-banks, N. J. to Ill. and southward. Peduncles very variable. (All tropical countries.)

## 47. HELIÓPSIS, Pers. Ox-eye.

Heads many-flowered, radiate; rays 10 or more, fertile. Involucral scales in 2 or 3 rows, nearly equal; the outer leaf-like and somewhat spreading, the inner shorter than the disk. Receptacle conical; chaff linear. Achenes smooth, thick, 4-angular, truncate; pappus none, or a mere border. — Perennial herbs, like Helianthus. Heads showy, peduncled, terminal. Leaves opposite, petioled, triple-ribbed, serrate. Flowers yellow. (Name composed of *ἥλιος, the sun,* and *ὄψις, appearance,* from the likeness to the Sunflower.)

1. **H. læ̀vis,** Pers. Nearly smooth (1–4° high); leaves ovate-lanceolate or oblong-ovate, rather narrowly pointed, occasionally ternate; scales (as in the next) with a rigid strongly nerved base; rays linear; pappus none or of 2–4 obscure teeth. — Banks and copses, N. Y. to Ill. and southward. Aug.

2. **H. scàbra,** Dunal. Roughish, especially the leaves, which are disposed to be less narrowly pointed, the upper sometimes entire; rays broadly oblong to linear or oblanceolate; pappus coroniform and chaffy or of 2 or 3 conspicuous teeth. (H. lævis, var. scabra, *Torr. & Gray.*) — Western N. Y. to Minn., Mo., and southward.

## 48. ECHINÀCEA, Moench. Purple Cone-flower.

Heads many-flowered, radiate; the rays very long, drooping, pistillate but sterile. Scales of the involucre imbricated, lanceolate, spreading. Receptacle conical; the lanceolate carinate spiny-tipped chaff longer than the disk-flowers. Achenes thick and short, 4-sided; pappus a small toothed border. — Perennial herbs, with the stout and nearly simple stems naked above and terminated by a single large head; leaves chiefly alternate, 3–5-nerved. Rays rose-purple, rather persistent; disk purplish. (Name formed from *ἐχῖνος, the hedgehog,* or *sea-urchin,* in allusion to the spiny chaff of the disk.)

1. **E. purpùrea,** Moench. *Leaves* rough, often serrate; the lowest *ovate, 5-nerved,* veiny, long-petioled; the others *ovate-lanceolate:* involucre imbricated in 3–5 rows; stem smooth, or in one form rough-bristly, as well as the leaves. — Prairies and banks, from W. Penn. and Va. to Iowa, and southward; occasionally adv. eastward. July. — Rays 15–20, dull purple (rarely whitish), 1–2′ long or more. Root thick, black, very pungent to the taste, used in popular medicine under the name of *Black Sampson.* — Very variable, and probably connects with

2. **E. angustifòlia,** DC. *Leaves,* as well as the slender simple stem, *bristly-hairy, lanceolate and linear-lanceolate, attenuate at base, 3-nerved, entire;* involucre less imbricated and heads often smaller; rays 12–15 (2′ long), rose-color or red. — Plains from Ill. and Wisc. southwestward. June–Aug.

## 49. RUDBÉCKIA, L. Cone-flower.

Heads many-flowered, radiate; the rays neutral. Scales of the involucre leaf-like, in about 2 rows, spreading. Receptacle conical or columnar; the short chaff concave, not rigid. Achenes 4-angular (in our species), smooth, not margined, flat at the top, with no pappus, or a minute crown-like border. — Chiefly perennial herbs, with alternate leaves, and showy terminal heads; the rays generally long, yellow, often darker at base. (Named in honor of the *Professors Rudbeck*, father and son, predecessors of Linnæus at Upsal.)

* *Disk columnar in fruit, dull greenish-yellow; leaves divided and cut.*

1. **R. laciniàta,** L. Stem smooth, branching (2 – 7° high); leaves smooth or roughish, the lowest pinnate, with 5 – 7 cut or 3-lobed leaflets; upper leaves irregularly 3 – 5-parted, the lobes ovate-lanceolate, pointed, or the uppermost undivided; heads long-peduncled; disk at first globular or hemispherical; chaff truncate, downy at the tip; rays oblanceolate (1 – 2′ long), drooping. — Low thickets; common. July – Sept. — Var. HÙMILIS, Gray, low and glabrous, some of the radical leaves undivided or with roundish divisions; heads smaller (½′ high) and ray shorter. Mountains of Va. and southward.

* * *Disk hemispherical to oblong-ovoid in fruit, dark purple or brown.*

+ *Lower leaves 3-lobed or parted.*

2. **R. tríloba,** L. Hairy, biennial, much branched (2 – 5° high), the branches slender and spreading; upper leaves ovate-lanceolate, sparingly toothed, the lower 3-lobed, tapering at the base, coarsely-serrate (those from the root pinnately parted or undivided); rays 8, oval or oblong; chaff of the black-purple depressed-globular disk smooth, awned. — Dry soil, Penn. to Mich., Mo., and southward. Aug. — Heads small, but numerous and showy.

3. **R. subtomentòsa,** Pursh. Stem branching above (3 – 4° high), downy, as well as the petiolate ovate or ovate-lanceolate serrate leaves beneath; heads short-peduncled; disk globular, dull brown; receptacle sweet-scented; chaff downy at the blunt apex. — Prairies, Wisc., Ill., Mo., and southward.

+ + *Leaves undivided, rarely laciniately toothed.*

4. **R. hírta,** L. *Biennial*, very rough and bristly-hairy throughout; stems simple or branched near the base, stout (1 – 2° high), naked above, bearing single large heads; *leaves nearly entire; the upper oblong or lanceolate, sessile;* the lower spatulate, triple-nerved, petioled; rays (about 14) more or less exceeding the involucre; *chaff of the dull brown disk hairy at the tip*, acutish. — Dry soil, western N. Y. to Wisc., and southward. Now common as a weed in eastern meadows, introduced with clover-seed from the West. June – Aug.

5. **R. fúlgida,** Ait. Hairy, the branches naked at the summit and bearing single heads; *leaves spatulate-oblong* or lanceolate, *partly clasping, triple-nerved, the upper entire, mostly obtuse;* rays about 12, equalling or exceeding the ample involucre; *chaff of the dark purple disk nearly smooth* and blunt. — Dry soil, N. J. and Penn. to Ky., Mo., and southward. — Variable, 1 – 3° high; the rays orange-yellow.

6. **R. spathulàta,** Michx. Pubescence short and appressed; slender, 8′ – 3° high; leaves obovate or spatulate or the upper ovate to lanceolate,

sometimes all lanceolate or oblanceolate to linear, denticulate; heads long-peduncled, smaller than in the preceding, the rays fewer and broader. — Pine woods, Va. to Tenn., and southward.

7. **R. speciòsa,** Wenderoth. Roughish-hairy (1 – 2° high), branched; the branches upright, elongated and naked above, terminated by single large heads; *leaves lanceolate or ovate-lanceolate, pointed at both ends, petioled*, 3 – 5-*nerved, coarsely and unequally toothed or incised;* involucre much shorter than the numerous elongated (1 – 1½′) rays; chaff of the dark purple disk acutish, smooth. — Dry soil, W. Penn. to Mich., Mo., and southward. July.

## 50. LÉPACHYS, Raf.

Heads many-flowered, radiate; the rays few, neutral. Involucral scales few and small, spreading. Receptacle oblong or columnar; the chaff truncate, thickened and bearded at the tip, partly embracing the flattened and margined achenes. Pappus none or 2 teeth. — Perennial herbs, with alternate pinnately divided leaves; the grooved stems or branches naked above, bearing single showy heads. Rays yellow or party-colored, drooping; disk grayish. (Name from λεπίς, *a scale*, and παχύς, *thick*, from the thickened tips of the chaff.)

1. **L. pinnàta,** Torr. & Gray. Hoary with minute appressed hairs, slender (4° high), branching; leaflets 3 – 7, lanceolate, acute; disk oblong, much shorter than the large and drooping light-yellow rays (which are 2′ long). — Dry soil, western N. Y. to Minn., and southward. July. — The receptacle exhales a pleasant anisate odor when bruised. Achenes slightly margined on the inner edge, obscurely 2-toothed at the top.

2. **L. columnàris,** Torr. & Gray. Branching from the base, 1 – 2° high; leaflets 5 – 9, oblong to narrowly linear, entire or 2 – 3-cleft; disk columnar, often 1′ long or more; ray as long or shorter, yellow or (var. PULCHÉRRIMA, Torr. & Gray) in part or wholly brown-purple. — Minn. to Tex.

## 51. BORRÍCHIA, Adans. SEA OX-EYE.

Heads many-flowered, radiate; rays fertile. Scales of the hemispherical involucre imbricated. Receptacle flat, covered with lanceolate rigid and persistent chaff. Achenes somewhat wedge-shaped, 3 – 4-angled; pappus a short 4-toothed crown. — Shrubby low maritime plants, coriaceous or fleshy, with opposite nearly entire leaves, and solitary peduncled terminal heads of yellow flowers; anthers blackish. (Named for *Olof Borrich*, a Danish botanist.)

1. **B. frutéscens,** DC. Whitened with a minute silky pubescence (6′ – 3° high); leaves obovate to spatulate-oblong or lanceolate, often toothed near the base; chaff rigidly pointed. — Va. and southward.

## 52. HELIÁNTHUS, L. SUNFLOWER.

Heads many-flowered, radiate; rays several or many, neutral. Involucre imbricated, herbaceous or foliaceous. Receptacle flat or convex; the persistent chaff embracing the 4-sided and laterally compressed smooth achenes, which are neither winged nor margined. Pappus very deciduous, of 2 thin chaffy scales on the principal angles, and sometimes 2 or more small intermediate scales. — Coarse and stout herbs, with solitary or corymbed heads, and yellow rays; flowering toward autumn. (Named from ἥλιος, *the sun*, and ἄνθος, *a flower*.)

§ 1. *Annuals; leaves mostly alternate, petiolate; receptacle flat; disk brownish.*

1. **H. ánnuus,** L. (Common Sunflower.) Tall, rough; leaves triple-ribbed, ovate or the lower cordate, serrate; involucral scales broadly ovate to oblong, long-pointed, ciliate; disk usually 1′ broad or more. — Minn. to Tex., and westward; long cultivated, and occasionally found in waste grounds.

2. **H. petiolàris,** Nutt. More slender, 1 – 3° high; leaves oblong- or ovate-lanceolate, smaller (1 – 3′ long), mostly entire; scales lanceolate or oblong-lanceolate, seldom ciliate; disk ½′ broad or more. — Minn. to Tex., and westward.

§ 2. *Perennials; receptacle convex or at length low-conical; lower leaves usually opposite.*

* *Involucral scales loose, becoming squarrose, narrowly lanceolate, pointed (½′ long); disk usually purple or brownish; leaves linear, 1-nerved.*

3. **H. orgyàlis,** DC. Stem glabrous, tall, very leafy; leaves mostly alternate, linear to filiform and entire, or the lowest lanceolate and serrulate; scales filiform-attenuate. — Dry plains, Mo. to Neb., south and westward.

4. **H. angustifòlius,** L. Stem slender (2 – 6° high), usually scabrous; leaves long and linear, sessile, entire, with revolute margins; heads loosely corymbed, long-peduncled; scales acute or pointed. — Low pine barrens, N. J. to Ky., and southward.

* * *Involucral scales closer, more imbricated, short, unequal and not foliaceous; leaves lanceolate to ovate, mostly opposite and 3-nerved.*

+ *Disk dark.*

5. **H. atròrubens,** L. *Rough-hairy; stem slender* (2 – 4° high), smooth and naked and forking above; *leaves thinnish, ovate or oval to oblong-lanceolate,* or the lowest heart-shaped (3 – 6′ long), serrate, abruptly contracted into a margined petiole; heads small, corymbed; scales ovate, obtuse, ciliolate, appressed; rays 10 – 16; pappus of 2 fringed scales. — Dry soil, Va. to Ark., and southward.

6. **H. rígidus,** Desf. *Stem stout* (2 – 6° high or more), simple or sparingly branched, rough; *leaves very thick and rigid, rough both sides, oblong-lanceolate,* usually pointed at both ends, nearly sessile, entire or serrate, the lowest oval; heads nearly solitary, pretty large; scales ovate or oblong, obtuse, or mostly acute, ciliate, appressed; rays 20 – 25, pappus of 2 large and often several small scales. — Dry prairies, Mich. to Ill., and westward.

+ + *Disk yellow.*

7. **H. lætiflòrus,** Pers. Closely resembling the last; leaves rather thinner; heads single or corymbed; scales rather fewer (in 2 or 3 rows), narrower and acute or mostly acuminate. — Dry open places, Ohio to Wisc. and Minn., and southward. — Rays showy, 1 – 2′ long.

8. **H. occidentàlis,** Riddell. Somewhat hairy, stem *slender, simple, naked above* (1 – 3° high, sending out runners from the base), bearing 1 – 5 small heads on long peduncles; *lowest leaves oval or lanceolate-ovate,* entire or obscurely serrate, *roughish-pubescent beneath, abruptly contracted into long hairy petioles; the upper small and remote;* scales ovate to lanceolate, acute or pointed, sometimes ciliate. — Dry barrens, Ohio to Wisc. and Minn., and southward.

* * * *Involucre looser, the scales more acuminate or elongated or foliaceous; disk yellow (anthers dark).*

+- *Leaves all opposite, sessile, serrulate; pubescence rather soft.*

9. **H. móllis,** Lam. Stem simple, leafy to the top (2 – 3° high); leaves ovate to lanceolate, with broad cordate clasping base, pointed; scales lanceolate, seldom exceeding the disk. — Dry barrens, Ohio to Iowa and southward.

+- +- *Leaves mostly alternate and 3-nerved, soft-pubescent beneath, scabrous above; scales very long and loose, hairy; tips of chaff and corolla-lobes hirsute.*

10. **H. tomentòsus,** Michx. Stem hairy, stout (4 – 8° high); leaves oblong-lanceolate, or the lowest ovate, tapering at both ends, obscurely serrate, large (5 – 12′ long), somewhat petioled; disk 1′ broad; rays 12 – 16, about 1′ long. — Rich woods, Ill. (?), Va., and southward along the mountains.

+- +- +- *Leaves narrow, chiefly alternate, not 3-nerved, scabrous both sides; heads rather small; scales loose, attenuate.*

11. **H. grósse-serràtus,** Martens. *Stem smooth and glaucous*, 6 – 10° high; *leaves elongated-lanceolate* or ovate-lanceolate, taper-pointed, sharply serrate or denticulate, acute or attenuate at base, *petioled*, often whiter and finely pubescent beneath; scales lance-awl-shaped, slightly ciliate. — Dry plains, Ohio to Dak., Mo., and southwestward. — Probably runs into the next.

12. **H. gigantèus,** L. *Stem hairy or rough* (3 – 10° high), branched above; *leaves lanceolate*, pointed, minutely serrate or nearly entire, green both sides, narrowed and ciliate at base, but *nearly sessile;* scales long, linear-lanceolate, pointed, hairy or strongly ciliate. — Var. AMBÍGUUS, Torr. & Gray; leaves mostly opposite and closely sessile by an obtuse base; perhaps a hybrid with n. 17. — Low thickets and swamps; common. Heads somewhat corymbed; the pale yellow rays 15 – 20; roots often becoming tuber-like.

13. **H. Maximiliàni,** Schrad. Resembling the last; stout, often simple, 1 – 10° high; leaves becoming rigid and very scabrous, entire or sparingly denticulate; heads rather large, usually short-peduncled, terminal and in the upper axils; scales longer attenuate, more rigid. — Prairies, Minn. to Tex.

+- +- +- +- *Leaves all or most of them opposite, 3-nerved (faintly in* n. 15).

++ *Heads very small (about 4″ broad); rays 5 – 8; scales few, short, irregularly imbricated, the outer with spreading foliaceous pointed tips; stems smooth.*

14. **H. parviflòrus,** Bernh. Stem 3 – 6° high, with numerous slender branches above; *leaves thin, ovate-lanceolate, taper-pointed*, somewhat serrate, petioled, *rough above*, pale and puberulent beneath; peduncles slender, rough; scales ovate and ovate-lanceolate, ciliate. (H. microcephalus, *Torr. & Gray.*) — Thickets, Penn. to Ill., and southward.

15. **H. lævigàtus,** Torr. & Gray. Stem slender (1 – 6° high), simple or sparingly branched, glaucous, *glabrous throughout*, as well as the slightly serrate *lanceolate leaves* which are usually narrow and attenuate to the base. — Dry soil, Alleghany Mts., and southward.

++ ++ *Heads larger; rays usually over* 10; *spreading by creeping rootstocks.*

= *Leaves sessile or subsessile to short-petiolate, serrulate or entire.*

16. **H. doronicoìdes,** Lam. Finely pubescent and roughish, 3 – 7° high; leaves *sessile*, ovate-oblong, acute, *triply-nerved above the broadly cuneate*

*base, serrulate;* scales loose, attenuate, mostly 6 – 8″ long, hairy. (H. cinereus, var. Sullivantii, *Torr. & Gray.*) — Dry ground, Ohio to Mo.

17. **H. divaricàtus,** L. Stem simple or forked and corymbed at the top (1 – 4° high), *smooth below; leaves all opposite and divaricate, ovate-lanceolate, 3-nerved from the rounded or truncate sessile base,* tapering gradually to a sharp point (3 – 6′ long), serrate, *thickish, rough both sides;* scales narrowly lanceolate, attenuate, ciliate, equalling the disk; rays 8 – 12. — Thickets and barrens; common. — Disk 6″ wide; rays 1′ long.

18. **H. hirsùtus,** Raf. *Stem* simple or forked above, stout (1 – 4° high), *bristly-hairy; leaves all shortly petioled, ovate-lanceolate,* gradually pointed, *slightly serrate,* rounded or obtuse at the base, *very rough* above, usually rough-hairy beneath; scales ovate-lanceolate, pointed, equalling the disk; rays about 12.— Dry plains, Ohio to Wisc., and southward.

19. **H. strumòsus,** L. Stem (3 – 6° high) very smooth below, often glaucous; *leaves ovate-lanceolate, tapering gradually to a point,* or the lower ovate and acute, abruptly contracted into short margined petioles, rough above, *whitish and naked or minutely downy underneath;* scales broadly lanceolate with spreading tips, ciliate, equalling the disk; rays 9 – 15. — Var. MÓLLIS, Torr. & Gray, has the leaves downy underneath, often subcordate, the scales looser and more attenuate. — River-banks and low copses; common, especially westward.

20. **H. tracheliifòlius,** Willd. Like the last; leaves thinner and nearly equally green both sides, more sharply serrate, all distinctly petioled; scales all loose and spreading, exceeding the disk, often much elongated. — Copses, Penn. and Ohio to Minn., and southward.

= = *Leaves longer-petiolate, thinnish or soft, coarsely serrate, commonly broad: scales loose, hirsute-ciliate.*

21. **H. decapétalus,** L. Stem branching (2 – 5° high), smooth below; leaves smooth or roughish, ovate, pointed, abruptly contracted into margined petioles; scales lanceolate-linear, elongated, loosely spreading, sometimes foliaceous, the outer longer than the disk; rays about 10. — Copses and low banks of streams; N. Eng. to Minn. and southward, common.

22. **H. tuberòsus,** L. (JERUSALEM ARTICHOKE.) Pubescent or hirsute, 5 – 10° high; leaves ovate or subcordate to oblong-lanceolate, acuminate, scabrous above, minutely pubescent or cinereous beneath; scales lanceolate, attenuate, little exceeding the disk; rays 12 – 20. (H. doronicoides, former ed.) — N. Y. to Minn., and southward; often cultivated. — Var. SUBCANÉSCENS, Gray; usually dwarf, the lower side of the leaves whitish with soft fine pubescence. Minn. to Mo.

## 53. VERBESÌNA, L. CROWNBEARD.

Heads several – many-flowered; the rays pistillate, or sometimes neutral and sterile, few, or sometimes none. Involucral scales imbricated in 2 or more rows. Receptacle rather convex (conical in n. 3); the chaff concave. Achenes flat (compressed laterally), winged or wingless, 2-awned. — Mostly perennial herbs; the toothed leaves decurrent on the stem. Flowers mostly yellow. ("Name metamorphosed from Verbena.")

* *Heads narrow, small, cymosely paniculate; rays few, pistillate, usually fertile; involucre erect.*

1. **V. occidentàlis,** Walt. Stem tall, 4-winged; *leaves opposite,* ovate to oblong-lanceolate, triple-nerved, serrate, pointed at both ends, often pubescent beneath (large and thin); heads in compound corymbs; receptacle flattish; *flowers yellow;* rays 1 – 5, lanceolate; achenes wingless. (V. Siegesbeckia, *Michx.*) — Rich soil, S. Penn. to Ill., and southward. July.

2. **V. Virgínica,** L. Stem narrowly or interruptedly winged, *downy-pubescent, like the lower surface of the* ovate-lanceolate feather-veined *alternate leaves;* heads in compound corymbs; receptacle convex; *flowers white;* rays 3 – 4, oval; achenes winged. — Dry soil, Penn. (?) to Ill., and southward. Aug.

* * *Heads broader, solitary or few.*

3. **V. helianthoìdes,** Michx. Perennial; stem hairy (1 – 3° high), widely winged by the ovate to the ovate-lanceolate sessile alternate leaves, which are rough above and soft-hairy beneath; involucre appressed; rays 8 – 15, pistillate or neutral, usually sterile; achenes winged, tipped with 2 fragile awns. (Actinomeris helianthoides, *Nutt.*) — Prairies and copses, Ohio to Iowa and southward. July.

4. **V. encelioìdes,** Benth. & Hook. Annual, branching, 1 – 2° high, cinereous; leaves alternate, ovate or cordate to deltoid-lanceolate, the petioles mostly winged and auriculate at base; involucral scales linear, equal, foliaceous, spreading; rays numerous, fertile. — Kan. to Tex., and westward.

## 54. ACTINÓMERIS, Nutt.

Heads many-flowered; rays neutral, few or none. Involucral scales few, herbaceous, nearly equal, soon deflexed beneath the globular disk. Receptacle small, chaffy. Achenes flat, obovate, winged or wingless, at maturity spreading in all directions; pappus of 2 or 3 smooth persistent awns. — Tall branching perennials, with serrate feather-veined leaves, tapering to the base and mostly decurrent on the stem. Heads corymbed; flowers chiefly yellow. (Name from *ἀκτίς, a ray,* and *μερίς, a part;* alluding to the irregularity of the rays.)

1. **A. squarròsa,** Nutt. Stem somewhat hairy, usually winged above (4 – 8° high); leaves alternate or the lower opposite, oblong or ovate-lanceolate, pointed at both ends; rays 2 – 8, irregular. — Rich soil, Penn. and W. New York to Iowa, and southward. Sept.

## 55. COREÓPSIS, L. TICKSEED.

Heads many-flowered, radiate; rays mostly 8, neutral, rarely wanting. Involucre double; each of about 8 scales, the outer rather foliaceous and somewhat spreading; the inner broader and appressed, nearly membranaceous. Receptacle flat, with membranaceous chaff deciduous with the fruit. Achenes flat, obcompressed (i. e., parallel with the scales of the involucre), often winged, not narrowed at the top, 2-toothed or 2-awned, or sometimes naked at the summit, the awns not barbed downwardly. — Herbs, generally with opposite leaves, and yellow or party-colored, rarely purple, rays. (Name from *κόρις, a bug,* and *ὄψις, resemblance;* from the form of the achene.)

§ 1. *Style-tips truncate or nearly so; outer involucre small and short; rays rose-color or yellow with brown base; pappus an obscure border or none.*

1. **C. ròsea,** Nutt. Perennial; stem branching, leafy, smooth (6–20′ high); leaves linear, entire; heads small, somewhat corymbed, on short peduncles; rays rose-color, 3-toothed; achenes oblong, wingless. — Sandy grassy swamps, Plymouth, Mass., to N. J., and southward; rare. Aug.

2. **C. cardaminefòlia,** Torr. & Gray. Annual, 6′–2° high; leaves 1–2-pinnately divided, the lobes oval to lanceolate or above linear; rays yellow with brown-purple base; achenes short, smooth or papillose, winged. — Kan. to La. and Tex.

3. **C. tinctòria,** Nutt. Annual, glabrous, 2–3° high; leaves 1–2-pinnately divided, the lobes lanceolate to linear; achenes oblong, wingless; rays yellow with more or less of crimson-brown. — Minn. to Tex., etc.; common in cultivation.

§ 2. *Style-tips abruptly cuspidate, hispid; involucres nearly equal; achenes roundish, winged, incurved, often papillose and with a callus inside at base and apex; pappus 2 small teeth or none; ray mostly yellow and palmately lobed; perennials, with long-pedunculate heads; lower leaves petiolate.*

4. **C. lanceolàta,** L. Smooth or hairy (1–2° high), tufted, branched only at the base; leaves all entire (the lower rarely with a pair of small lateral lobes), lanceolate, the lowest oblanceolate or spatulate; outer scales ovate-lanceolate. — Rich or damp soil, Mich. and Ill. to Va., and southward. July. Also cultivated in gardens. Heads showy; rays 1′ long. — Var. ANGUSTIFÒLIA, Torr. & Gray, is a low form with crowded narrow leaves and elongated peduncles. — Var. VILLÒSA, Michx., is hirsute below, the leaves rather broad.

5. **C. grandiflòra,** Nutt. Mostly glabrous; lower leaves lanceolate and spatulate, entire, the *upper* 3–5-*parted with lanceolate to linear and sometimes* 2–3-*parted lobes;* heads as in the last or larger. — S. Mo. to Tex. and Ga.

6. **C. pubéscens,** Ell. More leafy, 1–4° high, pubescent or nearly glabrous; leaves thickish, oblong or the lower oval-obovate and the upper oblong-lanceolate, entire or with 2–4 small lateral lobes; heads usually smaller. — Va. to S. Ill., Mo., and southward.

7. **C. auriculàta,** Linn. Pubescent or glabrous; stems 1–4° high, branching, sometimes with runners; leaves mostly petioled, the upper oblong or oval-lanceolate, entire; the lower oval or roundish, some of them variously 3–5-lobed or divided; outer scales oblong-linear or lanceolate; achenes narrowly winged and strongly involute. — Rich woods and banks, Va. to Ill., and southward. June–Sept.

§ 3. *Style-tips cuspidate; achenes oblong, nearly straight, without callus, the wing narrow or none; rays yellow, mostly entire or slightly toothed.*

* *Outer scales narrow, about the length of the inner, all more or less united at base; rays mostly entire, acute; pappus 2-toothed or none; leaves opposite, sessile, mostly 3-divided, appearing as if whorled; perennial, 1–3° high.*

+– *Leaves 3-cleft, but not to the base.*

8. **C. palmàta,** Nutt. Nearly smooth, simple; leaves broadly wedge-shaped, rigid; the lobes broadly linear, entire, or the middle one 3-lobed. — Prairies, Mich. to Minn., and southwestward. July.

+- +- *Leaves divided to the base, uppermost and lowest sometimes simple.*

9. **C. senifòlia,** Michx. Plant minutely soft-pubescent; leaves each divided into 3 sessile *ovate-lanceolate entire leaflets,* therefore appearing like 6 in a whorl. — Sandy woods, Va. and southward. July.

Var. **stellàta,** Torr. & Gray. Glabrous, and the leaves narrower. — Va., Ky., and southward.

10. **C. delphinifòlia,** Lam. Glabrous or nearly so; leaves divided into 3 sessile *leaflets* which are 2 – 5-*parted, their divisions lance-linear* (1 – 3″ broad), rather rigid; disk brownish. — Pine woods, Va. and southward. July.

11. **C. verticillàta,** L. Glabrous; leaves divided into 3 sessile *leaflets* which are 1 – 2-*pinnately parted into narrowly linear or filiform divisions.* — Damp soil, from Ont. and Mich. to Md., Ark., and southward. Cultivated in old gardens, but not showy. July – Sept.

* * *Outer scales narrow, shorter, all united at base; rays entire, obtuse; pappus none; leaves petiolate, pinnately* 3 – 5-*divided; perennial.*

12. **C. trípteris,** L. (Tall Coreopsis.) Smooth; stem simple (4 – 9° high), corymbed at the top; leaflets lanceolate, acute, entire. — Penn. to Wisc., Iowa, and southward. Aug. – Sept. — Heads exhaling the odor of anise when bruised; disk turning brownish.

* * * *Scales mostly distinct, the outer leafy, reflexed or spreading; achenes flat, obovate or cuneate-oblong,* 1-*nerved on each face,* 2-*toothed or* 2-*awned (rarely* 4-*awned); leaves petiolate, usually pinnately* 3 – 7-*divided, the lobes serrate; annuals (or biennial), branching. Approaching* Bidens.

+- *Rays conspicuous, golden yellow.*

++ *Achenes cuneate, obscurely ciliate or naked; outer scales about* 8.

13. **C. aùrea,** Ait. Nearly glabrous, 1 – 3° high; leaves variable, commonly 3 – 7-divided, or some or all undivided, the segments incisely serrate or lobed; *achenes broadly cuneate,* 1 – 2″ long, with 2 *very short blunt spreading teeth.* — Wet ground, Va. to Fl.

14. **C. trichospérma,** Michx. (Tickseed Sunflower.) Smooth, branched; leaves short-petioled, nearly all 3 – 7-divided; leaflets lanceolate or linear, cut-toothed, or the upper leaves only 3 – 5-cleft and almost sessile; heads panicled-corymbose; *achenes narrowly wedge-oblong or the inner ones wedge-linear,* about 4″ long, smooth or sparsely hairy, marginless, *crowned with* 2 *erect triangular or awl-shaped stout teeth.* — Swamps, Mass. to Va. near the coast. Also Cayuga, N. Y., to Ill., where is a var. TENUÍLOBA, Gray, with shorter achenes, approaching the last. Aug. – Oct.

++ ++ *Achenes obovate, very flat, with thin ciliate margins.*

15. **C. aristòsa,** Michx. Somewhat pubescent; leaves 1 – 2-pinnately 5 – 7-divided, petioled; leaflets lanceolate, cut-toothed or pinnatifid; heads panicled-corymbose; outer scales 8 – 10, not exceeding the inner, barely ciliate; *achenes* with 2 (rarely 4) *long and slender diverging awns* as long as the achene itself. — Swamps, Ohio to Mich., Minn., and southwestward. Aug. – Oct. — Var. MÙTICA has two short divergent teeth or points in place of the awns. — W. Ill. and southwestward. Forms occur with the barbs of the awns spreading or retrorse, hybrids with *Bidens frondosa* or other species.

16. **C. involucràta,** Nutt. Heads rather larger, the outer scales 12 – 20, mostly exceeding the inner, slender and hispid; achenes with 2 short acute teeth. — W. Ill. to Kan. and Tex.

+ + *Rays none, or rarely rudimentary; outer scales usually* 3 – 5, *loose, leafy, commonly surpassing the short-pedunculate heads; achenes narrowly cuneate; plants glabrous,* 1 – 3° *high; leaves petiolate.*

17. **C. bidentoìdes,** Nutt. Paniculately branched; *leaves undivided, lanceolate,* coarsely toothed, tapering at both ends; heads 6 – 10″ long; *achenes nearly subulate,* bearing a pair of *very slender* upwardly roughened *awns surpassing the corolla* (4″ long), but shorter than the achene, often also 2 minute teeth alternate with the awns. — Shores of Delaware River, near Philad., and Delaware Bay, to Md. Hybridizes with *Bidens frondosa.*

18. **C. discoídea,** Torr. & Gray. Diffusely branched, 1 – 2° high; *leaves ternately divided,* slender-petioled; leaflets ovate-lanceolate, pointed, coarsely serrate; heads 2 – 3″ long; *achenes linear-wedge-shaped* (2 – 3″ long), bearing a pair of *short and stout* upwardly-barbed *awns of the length of the corolla.* — Wet banks and swamps, Conn. to Ohio, Ill., and southward. July.

## 56. BÌDENS, L. BUR-MARIGOLD.

Heads many-flowered; the rays when present 3–8, neutral. Involucre double, the outer commonly large and foliaceous. Receptacle flattish; the chaff deciduous with the fruit. Achenes flattered parallel with the scales of the involucre, or slender and 4-sided, crowned with 2 or more rigid and persistent awns which are downwardly barbed. — Annual or perennial herbs, with opposite various leaves, and mostly yellow flowers. (Latin, *bidens,* two-toothed.)

* *Achenes flat, not tapering at the summit; outer involucre foliaceous; annuals.*

+ *Heads erect, nearly rayless; leaves mostly petiolate.*

1. **B. frondòsa,** L. (COMMON BEGGAR-TICKS. STICK-TIGHT.) Smooth or rather hairy, tall (2 – 6° high), branching; *leaves* 3 – 5-*divided; leaflets mostly stalked,* lanceolate, pointed, coarsely toothed; outer involucre much longer than the head, ciliate below; *achenes wedge-obovate, 2-awned, ciliate* (the bristles ascending except near the summit). — Moist waste places; a coarse troublesome weed, the achenes, as in the other species, adhering to clothing, etc., by their retrorsely barbed awns. Hybrids occur with *Coreopsis aristosa* and other species. July – Oct.

2. **B. connàta,** Muhl. (SWAMP BEGGAR-TICKS.) Smooth (1– 2° high); *leaves lanceolate* or oblong-lanceolate, pointed, sharply serrate, tapering into margined slightly united petioles; *the lower often 3-divided, their lateral divisions united at the base and decurrent on the petiole;* outer scales longer than the head, few, mostly obtuse; *rays none; achenes narrowly wedge-form,* 3- (2 – 4-) *awned, the margins minutely retrorsely ciliate.* — E. New Eng. to Minn., and southward. — Var. COMÒSA, Gray, is stouter, the leaves commonly all simple, upper ones nearly sessile, the heads larger and with very leafy involucre. Ill., Ky., and westward. Aug. – Oct. — Var. PINNÀTA, Watson; leaves nearly all pinnately divided, the 5 – 7 narrow divisions sparingly incised; achenes 4-awned. Hennepin Co., Minn. (*F. L. Couillard*).

+ + *Heads somewhat nodding, commonly radiate; leaves sessile, undivided.*

3. **B. cérnua,** L. (SMALLER BUR-MARIGOLD.) Nearly smooth (5′ – 3° high); *leaves lanceolate, unequally serrate, scarcely connate; heads* nodding, *with or without* (light yellow) *rays;* outer involucre longer than the head; achenes wedge-obovate, 4-awned, the margins downwardly barbed. — Wet places, N. Eng. to Va., Mo., Minn., and northward. July – Sept. — Rays, if any, smaller than in n. 4, and the outer involucre more leaf-like. (Eu.)

4. **B. chrysanthemoides,** Michx. (LARGER BUR-MARIGOLD.) Smooth, erect, or reclining at the base (6′ – 2° high); *leaves lanceolate,* tapering at both ends, more or less connate, *regularly serrate,* outer involucre mostly shorter than the *showy golden-yellow* (1′ *long*) *rays;* achenes wedge-shaped, with almost prickly downwardly barbed margins; awns 2, 3, or 4. — Swamps; common. Aug – Oct

* * *Achenes linear, 4-sided, the inner longer and tapering upward.*

5.* **B. bipinnàta,** L (SPANISH NEEDLES.) Smooth annual, branched; leaves 1 – 3-pinnately parted, petioled; leaflets ovate-lanceolate, mostly wedge-shaped at the base; heads small, on slender peduncles; outer involucre of linear scales equalling the short pale yellow rays, achenes 4-grooved and angled, nearly smooth, 3 – 4-awned. — Damp soil, R. I. to N. Y., Ill., and southward.

* * * *Achenes terete, truncate at both ends, with* 3 – 6 *very long awns smooth below.*

6 **B. Béckii,** Torr. (WATER MARIGOLD.) Aquatic, perhaps perennial, smooth; stems long and slender; immersed leaves crowded, capillary, many times dissected, the few emerging ones lanceolate, slightly connate, toothed; heads single, short-peduncled; involucre much shorter than the showy (golden yellow) rays; achenes thickish, smooth (½′ long), the stout divergent awns (1′ long) barbed only toward the apex. — Ponds and slow deep streams, Mass. to N. J., Mo., and northward. Aug. – Oct.

## 57. THELESPÉRMA, Less.

Heads many-flowered; rays about 8, neutral, or none. Involucre as in Coreopsis, the inner connate to the middle, scarious-margined. Receptacle flat, the scarious chaff falling with the nearly terete wingless and beakless achenes; pappus of 2 stout subulate retrorsely hispid awns. — Smooth herbs, with opposite dissected leaves and pedunculate heads of yellow flowers. (From θηλή, *a nipple*, and σπέρμα, *seed*, on account of the papillose achenes.)

1. **T. grácile,** Gray. Perennial, rather rigid, 1 – 2° high; leaves with narrow or filiform divisions or the upper entire; outer scales very short; rays short or usually none; achenes papillose. — Kan., south and westward.

## 58. BALDWÍNIA, Nutt.

Heads globular, many-flowered, radiate; the long and narrowly wedge-shaped rays neutral. Involucre short, of many thickish small scales imbricated in 3 or 4 rows, the outer obovate and obtuse. Receptacle strongly convex, with deep honeycomb-like cells containing the obconical or oblong silky-villous achenes; pappus of 7 – 9 lance-oblong erect chaffy scales. — A perennial herb, smoothish, with slender simple stems (2 – 3° high), bearing alternate oblanceolate leaves, and a large showy long-pedunculate head. Rays yellow (1′ long); the disk often turning dark purple. (Named for the late *Dr. William Baldwin.*)

1. **B. uniflòra,** Nutt. — Borders of swamps, Va. (?) and southward. Aug.

## 59. MARSHÁLLIA, Schreb.

Heads many-flowered; flowers all tubular and perfect, the corolla-lobes slender and spreading. Involucral scales linear-lanceolate, foliaceous, erect, in one or two rows, nearly equal. Receptacle convex or conical, with narrowly linear rigid chaff. Achenes top-shaped, 5-angled; pappus of 5 or 6 membranaceous and pointed chaffy scales. — Smooth and low perennials, with alternate entire 3-nerved leaves, and long-pedunculate heads (like those of a Scabious) terminating the simple stem or branches. Flowers purplish; anthers blue. (Named for *Humphrey Marshall*, of Pennsylvania, author of *Arbustum Americanum*, one of the earliest works on the trees and shrubs of this country.)

1. **M. latifòlia,** Pursh. Stems leafy; leaves ovate-lanceolate, pointed, sessile. — Dry soil, Va. and southward.

2. **M. cæspitòsa,** Nutt. Stem commonly leafy only at base; leaves narrowly oblanceolate to linear or the radical spatulate, obtuse. — Kan. to Tex.

## 60. GALINSÒGA, Ruiz & Pavon.

Heads several-flowered, radiate; rays 4–5, small, roundish, pistillate. Involucre of 4 or 5 ovate thin scales. Receptacle conical, with narrow chaff. Achenes angled; pappus of small oblong cut-fringed chaffy scales (sometimes wanting). — Annual herbs, with opposite triple-nerved thin leaves, and small heads; disk yellow; rays whitish. (Named for *Galinsoga*, a Spanish botanist.)

**G.** PARVIFLÒRA, Cav. Smoothish (1° high); leaves ovate, acute, somewhat toothed; scales of the pappus 8–16. — Waste places, especially eastward; spreading from year to year. (Adv. from S. Amer.)

## 61. HYMENOPÁPPUS, L'Her.

Heads many-flowered; flowers all tubular and perfect, with large revolute corolla-lobes. Involucral scales 6–12, loose and broad, thin, the upper part petal-like (usually white). Receptacle small, naked. Achenes top-shaped, with a slender base, striate; pappus of 15–20 blunt scales in a single row, very thin (whence the name of the genus, from ὑμήν, *membrane*, and πάππος, *pappus.*) — Biennial or perennial herbs, with alternate mostly dissected leaves, and corymbed small heads of usually whitish flowers.

* *Pappus of very small roundish nerveless scales.*

1. **H. scabiosæus,** L'Her. Somewhat flocculent-woolly when young, leafy to the top (1–3° high); leaves 1–2-pinnately parted into linear or oblong lobes; involucral scales roundish, mainly whitish. — Sandy barrens, Ill. and southward. May, June.

2. **H. corymbòsus,** Torr. & Gray. More slender, glabrate, naked above; scales obovate-oblong, petaloid at apex. — Neb. to Ark. and Tex.

* * *Pappus of conspicuous spatulate 1-nerved scales; involucre greener.*

3. **H. tenuifòlius,** Pursh. Slightly tomentose or glabrate, leafy, 1–2° high; divisions of the leaves narrowly linear or filiform, revolute; involucral scales obovate-oblong; achenes long-villous. — Neb. to Ark. and Tex.

## 62. ACTINÉLLA, Pers., Nutt.

Heads many-flowered; rays several, wedge-oblong, 3-toothed, pistillate. Scales of the hemispherical involucre ovate or lanceolate, membranaceous or coriaceous, nearly equal, appressed in 2 or 3 ranks, little shorter than the disk. Receptacle hemispherical or conical, naked. Achenes top-shaped, densely silky-villous; pappus of 5 or more ovate or lanceolate very thin chaffy scales. — Low herbs, with narrow alternate leaves, dotted or sprinkled with resinous atoms as in the next genus and bitter-aromatic; the solitary heads terminating scapes or slender naked peduncles; flowers yellow. (Name a diminutive of *Actinea*, from ἀκτίς, *ray*.)

* *Involucre of numerous distinct not rigid scales; leaves entire.*

1. **A. linearifòlia,** Torr. & Gray. Annual or biennial, villous or glabrate, 1° high or less, simple or branched; leaves linear; peduncles filiform. — S. Kan. to La., and Tex.

2. **A. acaùlis,** Nutt. Perennial, densely cespitose, the branches of the caudex short and thick, with scape-like peduncles, canescently villous or silky; leaves spatulate to linear, short. — Hills and plains bordering the Rocky Mts. and scarcely reaching our limits; the var. GLÀBRA, Gray (A. scaposa, var. glabra, *Man.*), a greener glabrate form, has been found on an Indian mound near Joliet, Ill. The less densely cespitose A. SCAPÒSA, Nutt., more loosely villous and the caudex with more slender branches, is probably in S. Kan.

* * *Scales rigid, in 2 rows, the outer connate at base; leaves ternately parted.*

3. **A. odoràta,** Gray. Annual, 1–2° high, branching, leafy, somewhat floccose-woolly; heads small, scattered; leaves 1–3-pinnately divided, the lobes filiform. — Central Kan. to Tex., and westward.

## 63. HELÈNIUM, L. Sneeze-weed.

Heads many-flowered, radiate; rays several, wedge shaped, 3–5-cleft, fertile or rarely sterile. Involucre small, reflexed, the scales linear or awl-shaped. Receptacle globose or oblong, naked. Achenes top-shaped, ribbed; pappus of 5–8 thin and 1-nerved chaffy scales, the nerve usually extended into a bristle or point. — Erect, branching herbs (ours perennial), with alternate leaves decurrent on the angled stem and branches, which are terminated by single or corymbed (yellow, rarely purple) heads; often sprinkled with bitter aromatic resinous globules. (The Greek name of some plant, said to be named after *Helenus*, son of Priam.)

1. **H. nudiflòrum,** Nutt. Somewhat puberulent, 1–3° high; leaves narrowly lanceolate or oblong to linear, entire, or the radical spatulate and dentate; heads mostly small; disk brownish, globose; ray yellow or partly brown-purple, sterile (neutral or style abortive), shorter than or exceeding the disk. (Leptopoda brachypoda, *Torr. & Gray.*) — Ill. and Mo. to N. Car. and Tex.; nat. near Philadelphia. Hybridizes with the next. June–Aug.

2. **H. autumnàle,** L. Nearly smooth, 1–6° high; leaves mostly toothed, lanceolate to ovate-oblong; heads larger (about 6″ broad); disk yellow; ray fertile, yellow. — Alluvial river-banks and wet ground, Conn. to Minn., south and westward. Sept.

### 64. GAILLÁRDIA, Foug.

Heads many-flowered; rays 3-cleft or -toothed, neutral or sometimes fertile, or none. Involucral scales in 2–3 rows, the outer larger, loose and foliaceous. Receptacle convex to globose, beset with bristle-like or subulate or short and soft chaff. Achenes top-shaped, 5-costate, villous; pappus of 5–10 long thin scales, awn-tipped by the excurrent nerve. — Erect herbs with alternate leaves and large showy heads of yellow or purplish fragrant flowers on terminal or scapiform peduncles. (Named after *Gaillard de Merentonneau.*)

1. **G. símplex,** Scheele. Annual; leaves all radical, usually spatulate, pinnatifid to entire; head globose on a naked scape, usually rayless. — S. Kan. to Tex.

2. **G. lanceolàta,** Michx. Annual, leafy-stemmed, branched, 1–2° high, finely pubescent; leaves oblanceolate to linear, mostly entire; rays rather few or none; chaff very short or obsolete. — S. Kan. to Tex. and Fla.

3. **G. aristàta,** Pursh. Perennial, hirsute, often 2° high; leaves lanceolate to oblanceolate, broad or narrow, entire to coarsely pinnatifid; rays usually numerous and long; chaff bristly or subulate. — Dak., west and southward.

### 65. DYSÒDIA, Cav. FETID MARIGOLD.

Heads many-flowered, usually radiate; rays pistillate. Involucre of one row of scales united into a firm cup, at the base some loose bractlets. Receptacle flat, not chaffy, but beset with short chaffy bristles. Achenes slender, 4-angled; pappus a row of chaffy scales dissected into numerous rough bristles. — Herbs, mostly annuals or biennials, dotted with large pellucid glands, which give a strong odor (as in Tagètes, the FRENCH MARIGOLD of the gardens, which belongs to the same group); heads terminating the branches; flowers yellow. (Name δυσωδία, *an ill smell,* which the plants exemplify.)

1. **D. chrysanthemoìdes,** Lag. Nearly smooth, diffusely branched (6–18′ high); leaves opposite, pinnately parted, the narrow lobes bristly-toothed or cut; rays few, scarcely exceeding the involucre. — Roadsides, and banks of rivers, Minn. to Ill., Tenn., and southwestward. Aug.–Oct.

### 66. ÁNTHEMIS, L. CHAMOMILE.

Heads many-flowered, radiate; rays pistillate or (in n. 1) neutral. Involucre hemispherical, of many small imbricated dry and scarious scales shorter than the disk. Receptacle conical, with slender chaff at least near the summit. Achenes terete or ribbed, glabrous, truncate; pappus none or a minute crown. — Branching strong-scented herbs, with finely pinnately dissected leaves and solitary terminal heads; rays white; disk yellow. (Ἀνθεμίς, the ancient Greek name of the Chamomile.)

**A.** CÓTULA, DC. (MAY-WEED.) Annual, acrid; rays mostly neutral; receptacle without chaff near the margin; pappus none; leaves finely 3-pinnately dissected. (Maruta Cotula, *DC.*) — Common by roadsides. (Nat. from Eu.)

**A.** ARVÉNSIS, L. (CORN CHAMOMILE.) Pubescent *annual or biennial,* resembling May-weed, but not ill-scented; leaves less finely 1–2-pinnately parted; chaff of the receptacle lanceolate, pointed; pappus a minute border. — Waste places; rare. (Adv. from Eu.)

**A.** NÓBILIS, L. (GARDEN CHAMOMILE.) More downy and *perennial,* pleasantly strong-scented; sterile shoots depressed or creeping; leaves very finely dissected; chaff of the receptacle blunt; pappus none. — Established near Lewiston, Delaware, *Nuttall.* (Adv. from Eu.)

### 67. ACHILLÈA, L. YARROW.

Heads many-flowered, radiate; the rays few, fertile. Involucral scales imbricated, with scarious margins. Receptacle chaffy, flattish. Achenes oblong, flattened, margined; pappus none. — Perennial herbs, with small corymbose heads. (So named because its virtues are said to have been discovered by *Achilles.*)

1. **A. Millefòlium,** L. (COMMON YARROW or MILFOIL.) Stems simple; *leaves twice-pinnately parted;* the divisions linear, 3 – 5-cleft, crowded; corymb compound, flat-topped; *involucre oblong; rays* 4 – 5, *short,* white (sometimes rose-color). — Fields and hills; common. Green and more glabrate in fields in the Atlantic States, and perhaps in such cases introduced. Aug. (Eu.)

**A.** PTÁRMICA, L. (SNEEZEWORT.) *Leaves simple, lance-linear,* sharply serrate with appressed teeth; corymb loose; *rays* 8 – 12, *much longer than the broader campanulate involucre;* flowers white. — Mass., Mich., etc.; rare. Apparently indigenous on the Lower St. Lawrence. (Adv. from Eu.)

### 68. MATRICÀRIA, Tourn. WILD CHAMOMILE.

Heads many-flowered; rays pistillate, or wanting. Scales of the involucre imbricated, with scarious margins. Receptacle conical, at least in fruit, naked. Achenes 3 – 5-ribbed, wingless; pappus a membranaceous crown or border, or none. — Smooth and branching herbs (ours annuals or biennials) with finely divided leaves and single or corymbed heads. Rays white or none; disk yellow. (Named for reputed medicinal virtues.)

**M.** INODÒRA, L. Leaves twice-pinnately divided into fine almost filiform lobes; *heads large,* naked-peduncled, and *with many long rays;* achenes strongly 3-ribbed; pappus a short crown or border. — (Wild far northward.) Roadsides, Eastport, Maine, *Prof. Verrill.* Aug. (Adv. from Eu.)

**M.** DISCOÍDEA, DC. Low (6 – 9′ high); leaves 2 – 3-pinnately parted into short linear lobes; *heads rayless,* short-peduncled; scales oval, with broad margins, much shorter than the conical disk; achenes more terete; pappus obsolete. — Banks of the Mississippi opposite St. Louis. An immigrant from Oregon, extending eastward and becoming naturalized near railroad stations; also established in N. Europe. July – Sept.

### 69. CHRYSÁNTHEMUM, Tourn. OX-EYE DAISY.

Heads many-flowered; rays numerous, fertile. Scales of the broad and flat involucre imbricated, with scarious margins. Receptacle flat or convex, naked. Disk-corollas with a flattened tube. Achenes of disk and ray similar, striate, without pappus. — Perennial herbs, with toothed, pinnatifid, or divided leaves, and single or corymbed heads. Rays white; disk yellow. (Old Greek name, *χρυσάνθεμον,* i. e. golden flower.)

**C.** LEUCÁNTHEMUM, L. (OX-EYE or WHITE DAISY. WHITE-WEED.) Stem erect, nearly simple, naked above and bearing a single large head; root-leaves spatulate, petioled, the others partly clasping, all cut or pinnatifid-toothed; scales of the involucre with rusty-brown margins. (Leucanthemum vulgare, *Lam.*) — Fields and meadows; abundant eastward. June, July. A pernicious weed, with large and showy heads. It occurs with abortive, deformed, or tubular and laciniate rays. (Nat. from Eu.)

**C.** PARTHÈNIUM, Pers. (FEVERFEW.) Tall, branched, leafy; leaves twice-pinnately divided, the *divisions ovate, cut; heads corymbed,* rather small. (Leucanthemum Parthenium, *Godron.*) — Escaped from gardens in some places. (Adv. from Eu.)

## 70. TANACÈTUM, L. Tansy.

Heads many-flowered, nearly discoid; flowers all fertile, the marginal chiefly pistillate and 3-5-toothed. Involucre imbricated, dry. Receptacle convex. naked. Achenes angled or ribbed, with a large flat top; pappus a short crown. — Bitter and acrid strong-scented herbs (ours perennial), with 1-3-pinnately dissected leaves, and corymbed heads. Flowers yellow; in summer. (Name of uncertain derivation.)

**T. vulgàre**, L. (Common Tansy.) Stem (2-4° high) smooth; leaflets and the wings of the petiole cut-toothed; corymb dense; pistillate flowers terete, with oblique 3-toothed limb; pappus 5-lobed. — Var. críspum has the leaves more cut and crisped. — Escaped from gardens to roadsides; Atlantic States. (Nat. from Eu.)

1. **T. Huronénse**, Nutt. Hairy or woolly when young, stout (1-3° high); lobes of the leaves oblong; heads large (½-⅝′ wide) and usually few; pistillate flowers flattened, 3-5-cleft; pappus toothed. — St. John's River, Maine (*G. L. Goodale*), shores of the upper Great Lakes, and westward.

## 71. ARTEMÍSIA, L. Wormwood.

Heads discoid, few-many-flowered; flowers all tubular, the marginal ones pistillate, or sometimes all similar and perfect. Involucre imbricated, dry and scarious. Receptable small and flattish, naked. Achenes obovoid, with a small summit and no pappus. — Herbs or shrubby plants, bitter and aromatic, with small commonly nodding heads in panicled spikes or racemes; flowering in summer. Corolla yellow or purplish. (Ancient name of the Mugwort, in memory of *Artemisia*, wife of Mausolus.)

§ 1. *Receptacle smooth; marginal flowers pistillate and fertile; disk-flowers perfect but sterile, the style mostly entire; root perennial, except in* n. 1.

* *Leaves dissected.*

1. **A. caudàta**, Michx. Smooth (2-5° high); upper leaves pinnately, the lower 2-3-pinnately divided; *the divisions thread-form*, diverging; *heads small, the racemes in a wand-like elongated panicle;* root biennial. — Sandy soil, coast of N. H. to Va.; also Mich. to Minn., and southward.

2. **A. Canadénsis**, Michx. Smooth, or hoary with silky down (1-2° high); lower leaves twice-pinnately divided, the upper 3-7-divided, *the divisions linear, rather rigid; heads rather large, in panicled racemes.* — Northern N. Eng. to the Great Lakes, Minn., and northward. (Eu.)

* * *Leaves entire or some 3-cleft.*

3. **A. dracunculòides**, Pursh. Tall (2-5°), somewhat woody at base, slightly hoary or glabrous; leaves linear and entire or the lower 3-cleft; heads small and numerous, panicled. — Sandy banks of streams, Minn. to Ill., Mo., and westward.

4. **A. glaùca**, Pall. Strict, 1-2° high, somewhat woody at base, minutely silky-pubescent or glabrate; leaves linear- to oblong-lanceolate; heads as in the last. — Sask. to Minn. (Sib.)

5. **A. filifòlia**, Torr. Suffruticose, finely canescent, 1-3° high; leaves all filiform, the lower commonly 3-parted; heads very small and numerous, crowded in a long leafy panicle. — Central Kan. to Neb., and southwestward.

§ 2. *Receptacle smooth ; flowers all fertile, a few pistillate, the others perfect.*

Two cultivated shrubby species, from Europe, with filiformly divided leaves, have occasionally escaped from gardens and become spontaneous, viz., A. ABRÓTINUM, L. (the SOUTHERNWOOD), of strict habit, with leaves 1 – 2-pinnatifid and pubescent heads, and A. PRÒCERA, L., with more spreading branches, all the leaves finely 2-pinnatifid, and heads glabrous.

* *Tall* (1 – 5°) *and branching perennials, whitened with fine and close-pressed wool ; heads small, in leafy panicles.*

6. **A. serràta,** Nutt. Very leafy, 6 – 9° high ; leaves lanceolate or the upper linear, serrate, white-tomentose beneath, green above ; heads greenish, oblong, 2″ long or less. — Ill. to Dak.

7. **A. longifòlia,** Nutt. Stem 2 – 5° high ; leaves linear or linear-lanceolate, entire, usually glabrate above ; heads oblong, canescent, 2 – 3″ long — Minn. to Neb., and westward.

8. **A. Ludoviciàna,** Nutt. (WESTERN MUGWORT.) *Whitened woolly* throughout ; *leaves lanceolate,* the upper *mostly entire,* the lower usually cut-lobed, toothed or pinnatifid, the upper surface sometimes glabrate and green ; heads campanulate, mostly sessile in narrow panicles. — Dry banks, Sask. to Mich., Ill., Tex., and westward. Very variable.

**A.** VULGÀRIS, L. (COMMON MUGWORT.) *Leaves mostly glabrous and green above,* beneath and the branches white-woolly, all pinnatifid, with the divisions often cut-lobed, linear-lanceolate ; heads small in open panicles. — Waste places, near dwellings. (Adv. from Eu.)

* * *Densely white-tomentose perennial ; heads large, racemose-glomerate.*

9. **A. Stelleriàna,** Bess. Stout, 1 – 2° high, from a creeping base ; leaves obovate or spatulate, pinnatifid, the lobes obtuse. — Sandy sea-beaches, E. Mass. ; locally nat. from N. E. Asia?

* * * *Less branched* (1 – 3°), *biennial or annual, glabrous.*

10. **A. biénnis,** Willd. Strict, 1 – 3° high ; lower leaves twice-pinnately parted, the upper pinnatifid ; lobes linear, acute, in the lower leaves cut-toothed ; heads in short axillary spikes or clusters, crowded in a narrow and glomerate leafy panicle. — Gravelly banks, Ohio to Tenn., Mo., and northwestward ; rapidly extending eastward by railroad to Buffalo, Philadelphia, etc.

**A.** ÁNNUA, L. Tall, much branched ; leaves 2-pinnately divided, the oblong segments deeply pinnatifid ; heads small, in a loose ample panicle. — Ind. to Kan. (Nat. from Old World.)

§ 3. *Receptacle hairy ; flowers all fertile, the marginal ones pistillate.*

**A.** ABSÍNTHIUM, L. (WORMWOOD.) Rather shrubby (2 – 3° high), silky-hoary ; leaves 2 – 3-pinnately parted, lobes lanceolate ; heads hemispherical, panicled. — Roadsides, escaped from gardens. (Adv. from Eu.)

11. **A. frígida,** Willd. Low (6 – 20′ high), in tufts, slightly woody at the base, white-silky ; leaves pinnately parted and 3 – 5-cleft, the divisions narrow-linear ; heads globose, racemose. — Dry hills and rocks, Sask. to Minn., W. Tex., and westward

## 72. TUSSILÀGO, Tourn. COLTSFOOT.

Head many-flowered ; ray-flowers in several rows, narrowly ligulate, pistillate, fertile ; disk-flowers with undivided style, sterile. Involucre nearly simple. Receptacle flat. Achenes cylindrical-oblong ; pappus copious, soft and capillary. — A low perennial, with horizontal creeping rootstocks, sending up simple scaly scapes in early spring, bearing a single head, and producing rounded-heart-shaped angled or toothed leaves later in the season, woolly when young. Flowers yellow. (Name from *tussis*, a cough, for which the plant is a reputed remedy.)

**T. Fárfara**, L. — Wet places, and along brooks, N. Eng., N. Y., and Penn.; thoroughly wild. (Nat. from Eu.)

## 73. PETASÌTES, Tourn. Sweet Coltsfoot.

Heads many-flowered, somewhat diœcious; in the substerile plant with a single row of ligulate pistillate ray-flowers, and many tubular sterile ones in the disk; in the fertile plant wholly or chiefly of pistillate flowers, tubular or distinctly ligulate. Otherwise as Tussilago. — Perennial woolly herbs, with the leaves all from the rootstock, white-woolly beneath, the scape with sheathing scaly bracts, bearing heads of purplish or whitish fragrant flowers, in a corymb. (The Greek name for the coltsfoot, from πέτασος, a broad-brimmed hat, on account of its large leaves.)

* *Pistillate flowers ligulate; flowers whitish.*

1. **P. palmàta**, Gray. Leaves rounded, somewhat kidney-form, palmately and deeply 5 – 7-lobed, the lobes toothed and cut. (Nardosmia palmata, *Hook.*) — Swamps, Maine and Mass. to Mich, Minn., and northwestward; rare. April, May. — Full-grown leaves 6 – 10′ broad.

2. **P. sagittàta**, Gray. Leaves deltoid-oblong to reniform-hastate, acute or obtuse, repand-dentate. — N. Minn. and westward.

* * *Ligules none; flowers purplish.*

**P. vulgàris**, Desf. Rootstock very stout: leaves round-cordate, angulate-dentate and denticulate. — About Philadelphia. (Nat. from Eu.)

## 74. ÁRNICA, L.

Heads many-flowered, radiate; rays pistillate. Scales of the bell-shaped involucre lanceolate, equal, somewhat in 2 rows. Receptacle flat, fimbrillate. Achenes slender or spindle-shaped; pappus a single row of rather rigid and strongly roughened-denticulate bristles. — Perennial herbs, chiefly of mountains and cold northern regions, with simple stems, bearing single or corymbed large heads and opposite leaves. Flowers yellow. (Name thought to be a corruption of *Ptarmica*.)

1. **A. Chamissònis**, Less. Soft-hairy; *stem leafy* (1 – 2° high), bearing 1 to 5 heads; *leaves thin, veiny*, smoothish when old, toothed; the upper *ovate-lanceolate*, closely sessile, the lower narrower, tapering to a margined petiole; scales pointed; pappus almost plumose. (A. mollis, *Hook.*) — N. Maine, mountains of N. H. and northern N. Y., shores of L. Superior, and westward. July.

2. **A. nudicaùlis**, Nutt. Hairy and rather glandular (1 – 3° high); *leaves thickish*, 3 – 5-*nerved, ovate or oblong*, all sessile, mostly entire and near the root, the *cauline small* and only one or two pairs; heads several, corymbed, showy. — Damp pine barrens, S. Penn. and southward. April, May.

## 75. SENÈCIO, Tourn. Groundsel.

Heads many-flowered; rays pistillate, or none; involucre cylindrical to bell-shaped, simple or with a few bractlets at the base, the scales erect-connivent.

Receptacle flat, naked. Pappus of numerous very soft and slender capillary bristles. — Herbs, in the United States, with alternate leaves and solitary or corymbed heads. Flowers chiefly yellow. (Name from *senex*, an old man, alluding to the hoariness of many species, or to the white hairs of the pappus.)

* *Root annual or in* n. 3 *biennial; heads several or many in a corymb; herbage glabrous or soon becoming so.*

+ *Rays none or minute.*

**S. vulgàris**, L. (Common Groundsel.) Low, corymbosely branched, glabrate; leaves pinnatifid and toothed; clasping tips of involucral scales blackish; rays none. — Waste grounds. July – Sept. (Adv. from Eu.)

**S. viscòsus**, L. Coarser, viscid-pubescent and strong-scented; leaves 2-pinnatifid; scales not black-tipped; rays minute. — Waste grounds, coast of N. Eng. (Nat. from Eu.)

+ + *Heads conspicuously radiate.*

1. **S. lobàtus**, Pers. (Butter-weed.) Rather tall; leaves somewhat fleshy, *lyrate or pinnate*, the divisions or leaflets crenate or cut-lobed, variable; heads small in a naked corymb; *rays* 6 – 12, *conspicuous.* — Wet grounds, N. Car. to S. Ill., Mo., and southward. April – July.

2. **S. palústris**, Hook. Annual or biennial, loosely woolly or glabrate; stem stout, 6′ – 2° high; *leaves* oblong-lanceolate, *irregularly toothed or laciniate*, the upper with a heart-shaped clasping base; *rays* 20 *or more*, short, pale yellow; pappus copious and becoming very long. — Wet ground, Iowa to N. Wisc., Minn., and northward. June. (Eu.)

* * *Root perennial; heads small or middle-sized, in a naked corymb.*

3. **S. aùreus**, L. (Golden Ragwort. Squaw-weed.) *Smooth, or floccose-woolly when young* (1 – 3° high); leaves thin, the radical *simple and rounded*, the larger ones mostly heart-shaped, crenate-toothed, *long-petioled; lower stem-leaves lyrate;* upper ones lanceolate, cut-pinnatifid, sessile or partly clasping; corymb umbel-like; rays 8 – 12. — Common everywhere. May, June. Varies greatly.

Var. **obovàtus**, Torr. & Gray. Root-leaves thicker, round-obovate with a cuneate or truncate base, or the earliest almost sessile in rosulate tufts. (S. Elliottii, *Torr. & Gray.*) — Open grounds, Can. to Ind. and Ga.

Var. **Balsámitæ**, Torr. & Gray. Less glabrate; root-leaves oblong, spatulate, or lanceolate, narrowed to the petiole, serrate, the upper lyrate-pinnatifid; heads rather small and numerous. — Common.

4. **S. tomentòsus**, Michx. (Woolly Ragwort.) *Clothed with scarcely deciduous hoary wool* (1 – 2° high); *root-leaves oblong*, obtuse, crenate or entire, often large, on elongated stout petioles; the upper sessile, similar or lyrate-pinnatifid; corymb flat-topped; rays 12 – 15. — Del. and mountains of Penn. (*Pursh.*), to Fla. and Ark. May.

5. **S. cànus**, Hook. Usually low, persistently tomentose, rarely at all glabrate; leaves much smaller, spatulate to oblong, all entire or some cut-toothed or pinnatifid; achenes glabrous. — N. Minn., Dak., and westward.

6. **S. integérrimus**, Nutt. Woolly pubescent when young, soon glabrate and green; leaves oblong-lanceolate or oblong, entire or denticulate, the upper bract-like, attenuate from a broad base; heads rather large (6″ high), with green-tipped scales. — Sask. to Minn., and westward.

7. **S. lùgens,** Richards. Like the last; leaves usually repand- or callous-denticulate; heads usually smaller, with mostly black-tipped scales. — Subarc. Amer. to New Mex., in the mountains; reported from Minn. and N. Iowa.

* * * *Root perennial; heads large and often solitary.*

8. **S. Pseùdo-Árnica,** Less. Loosely white-woolly, sometimes becoming glabrous; stem stout, 6 – 12′ high, leafy to the top; leaves oblong, repand, tapering into a narrow petiole-like base; heads 1 – 4, over an inch in diameter; rays 20 or more, large. — Grand Manan Island, off Maine (*Prof. Verrill*), to Lab., and northward.

## 76. CACÀLIA, L. INDIAN PLANTAIN.

Heads 5 – many-flowered; the flowers all tubular and perfect. Involucral scales in a single row, erect-connivent, with a few bractlets at the base. Receptacle naked. Corolla deeply 5-cleft. Achenes oblong, smooth; pappus of numerous soft capillary bristles. — Smooth and tall perennial herbs, with alternate often petioled leaves, and rather large heads, in flat corymbs. Flowers white or whitish. (An ancient name, of uncertain meaning.)

* *Involucre 25 – 30-flowered, with several bracts at its base; receptacle flat.*

1. **C. suavèolens,** L. Stem grooved (3 – 5° high); *leaves triangular-lanceolate, halberd-shaped*, pointed, serrate, those of the stem on winged petioles. — Rich woods, Conn. to Mich., Iowa, and southward; rare. Sept.

* * *Involucre 5-leaved and 5-flowered, its bracts minute or none; receptacle bearing a more or less evident scale-like pointed appendage in the centre.*

2. **C. renifórmis,** Muhl. (GREAT INDIAN PLANTAIN.) Not glaucous; stem (4 – 9° high) grooved and angled; *leaves green both sides, dilated fan-shaped, or the lowest kidney-form* (1 – 2° broad), *repand-toothed* and angled, palmately veined, petioled; the teeth pointed; corymbs large. — Rich damp woods, N. J. to Ill., Minn., and southward along the mountains. Aug.

3. **C. atriplicifòlia,** L. (PALE INDIAN P.) Glaucous; stem terete (3 – 6° high); leaves *palmately veined and angulate-lobed*, the lower triangular-kidney-form or slightly heart-shaped, the upper rhomboid or wedge-form, *toothed.* — Rich woodlands, western N. Y. to Wisc., Minn., and southward. Aug.

4. **C. tuberòsa,** Nutt. (TUBEROUS INDIAN P.) Stem angled and grooved (2 – 6° high), from a thick or tuberous root; *leaves green both sides*, thick, strongly 5 – 7-*nerved;* the lower *lance-ovate or oval*, nearly entire, tapering into long petioles; the upper on short margined petioles, sometimes toothed at the apex. — Wet prairies, etc., Ohio to Wisc., Minn., and southward. June.

## 77. ERECHTÌTES, Raf. FIREWEED.

Heads many-flowered; the flowers all tubular and fertile; the marginal pistillate, with a slender corolla. Scales of the cylindrical involucre in a single row, linear, acute, with a few small bractlets at the base. Receptacle naked. Achenes oblong, tapering at the end; pappus copious, of very fine and white soft hairs. — Erect and coarse annuals, of rank smell, with alternate simple leaves, and paniculate-corymbed heads of whitish flowers. (The ancient name of some species of Groundsel, probably called after *Erechtheus*.)

1. **E. hieracifòlia,** Raf. (FIREWEED.) Often hairy; stem grooved (1 – 6° high); leaves lanceolate or oblong, acute, cut-toothed, sessile, the upper auricled at base. — Moist woods; common, especially northward, and in recent clearings that have been burned over; whence the popular name. July – Sept.

## 78. ÁRCTIUM, L. BURDOCK.

Heads many-flowered; flowers all tubular, perfect and similar. Involucre globular; the imbricated scales coriaceous and appressed at base, attenuate to long stiff points with hooked tips. Receptacle bristly. Achenes oblong, flattened, wrinkled transversely; pappus short, of numerous rough bristles, separate and deciduous. — Coarse biennial weeds, with large unarmed and petioled leaves, and small solitary or clustered heads; flowers purple, rarely white. (Name probably from ἄρκτος, *a bear*, from the rough involucre.)

**A.** LÁPPA, L. Stout, 1 – 3° high; leaves roundish or ovate and mostly cordate, or lanceolate with cuneate base, smooth above, somewhat floccose-tomentose beneath, mostly sinuate-denticulate. (Lappa officinalis, *All.*) — The several reputed species of the genus are scarcely distinguishable even as varieties. Var. MÌNUS, has rather small ovoid subracemose heads (about 8″ broad), on short peduncles, glabrous or somewhat cottony, the inner scales somewhat purplish-tipped, equalling the flowers; leaves occasionally cut-toothed. By roadsides; very common. — Var. MÀJUS, with broader (1′) green and glabrous subcorymbose rather long-pedunculate heads. Less frequent. — Var. TOMENTÒSUM, a form of the last with more spherical webbed heads, with purplish scales shorter than the flowers. Rare. — July – Oct. (Nat. from Eu.)

## 79. CNÌCUS, Tourn. COMMON OR PLUMED THISTLE.

Heads many-flowered; flowers all tubular, perfect and similar, rarely imperfectly diœcious. Scales of the ovoid or spherical involucre imbricated in many rows, tipped with a point or prickle. Receptacle thickly clothed with soft bristles or hairs. Achenes oblong, flattish, not ribbed; pappus of numerous bristles united into a ring at the base, plumose to the middle, deciduous. — Herbs, mostly biennial, with sessile alternate leaves, often pinnatifid, prickly. Heads usually large, terminal. Flowers reddish-purple, rarely white or yellowish; in summer. (Latin name of the Safflower, from the Greek κνῆκος.)

* *Scales of the involucre all tipped with spreading prickles.*

**C.** LANCEOLÀTUS, Hoffm. (COMMON THISTLE.) Leaves decurrent on the stem, forming prickly lobed wings, pinnatifid, rough and bristly above, woolly with deciduous webby hairs beneath, prickly; flowers purple. (Cirsium, *Scop.*) — Pastures and roadsides, everywhere, at the North. (Nat. from Eu.)

* * *Heads leafy-bracteate at base* (see also n. 8); *proper scales not prickly.*

1. **C. horrídulus,** Pursh. (YELLOW THISTLE.) Stem stout (1 – 3° high), webby-haired when young; leaves partly clasping, green, soon smooth, lanceolate, pinnatifid, the short toothed and cut lobes very spiny with yellowish prickles; heads (1 – 1½′ broad) surrounded by leaf-like and very prickly bracts, which usually equal the narrow scales; flowers pale yellow or purple. (Cirsium, *Michx.*) — Sandy fields, Mass. to Va., and southward, near the coast.

* * * *Scales appressed, the inner not at all prickly.*

+ *Leaves white-woolly beneath, and sometimes also above; outer scales successively shorter, and tipped with short prickles.*

2. **C. Pítcheri,** Torr. *White-woolly throughout,* low; stem very leafy; *leaves all pinnately parted into rigid narrowly linear and elongated, sometimes*

*again pinnatifid divisions*, with revolute margins; flowers cream-color. (Cirsium, *Torr. & Gray.*) — Sandy shores of Lakes Michigan, Huron, and Superior.

3. **C. undulàtus,** Gray. *White-woolly throughout*, low and stout, leafy; *leaves lanceolate-oblong*, partly clasping, undivided, *undulate-pinnatifid*, or rarely pinnately parted, moderately prickly; flowers reddish-purple. (Cirsium, *Spreng.*) — Islands of L. Huron to Minn., Kan., and westward. The heads vary much in size.

4. **C. altíssimus,** Willd. Stem downy, branching (3–10° high), *leafy quite to the heads; leaves* roughish-hairy above, whitened with close wool beneath, *oblong-ovate to narrowly lanceolate, undivided, sinuate-toothed, undulate-pinnatifid, or twice pinnatifid*, the lobes or teeth weakly prickly; heads 1½–2′ high; flowers chiefly purple. (Cirsium, *Spreng.*) — Fields and copses, Mass. to Minn., and southward.

Var. **discolor,** Gray. Stem 2–6° high; leaves nearly all deeply pinnatifid into lanceolate or linear lobes. (Cirsium discolor, *Spreng.*) — Common; N. Eng. to Ill., and southward.

5. **C. Virginiànus,** Pursh. Stem woolly, slender, simple or sparingly branched (1–3° high), the *branches or long peduncles naked; leaves lanceolate*, green above, whitened with close wool beneath, ciliate with prickly bristles, *entire or sparingly sinuate-lobed*, sometimes the lower deeply sinuate-pinnatifid; heads small; outer scales scarcely prickly; flowers purple. (Cirsium, *Michx.*) — Woods and plains, Va., Ohio, and southward.

*+ + Leaves green both sides, or only with loose cobwebby hairs underneath; heads large; scales scarcely prickly-pointed.*

6. **C. mùticus,** Pursh. (Swamp Thistle.) *Stem tall* (3–8° high), angled, smoothish, panicled at the summit; branches sparingly leafy, bearing single or few rather large *heads; leaves* somewhat hairy above, whitened *with loose webby hairs beneath* when young, *deeply pinnatifid, the divisions lanceolate*, acute, cut-lobed, prickly-pointed; *scales of the webby and glutinous* (sometimes glabrate) *involucre* closely appressed, *pointless* or barely mucronate; flowers purple. (Cirsium, *Michx.*) — Swamps and low woods; common.

7. **C. pùmilus,** Torr. (Pasture Thistle.) *Stem low* and stout (1–2° high), hairy, bearing 1–3 very large *heads* (1½′ broad), which are often *leafy-bracted* at the base; *leaves green*, lanceolate-oblong, partly clasping, *somewhat hairy, pinnatifid, with short and cut very prickly-margined lobes; outer scales prickly-pointed*, the inner very slender; flowers purple or rarely white (fragrant, 2′ long). (Cirsium, *Spreng.*) — Dry fields, N. Eng., near the coast, to Penn.

* * * * *Outer scales of the appressed involucre barely prickly-pointed; heads imperfectly diœcious, small and numerous.*

**C.** arvénsis, Hoffm. (Canada Thistle.) Perennial, slender, 1–2° high, the roots extensively creeping; leaves oblong or lanceolate, smooth, or slightly woolly beneath, sinuate-pinnatifid, prickly-margined; flowers rose-purple. (Cirsium, *Scop.*) — Cultivated fields, pastures, and roadsides, common; a most troublesome weed, extremely difficult to eradicate. (Nat. from Eu.)

### 80. CÁRDUUS, Tourn. Plumeless Thistle.

Bristles of the pappus naked (not plumose), merely rough or denticulate. Otherwise as in Cnicus. (The ancient Latin name.)

**C. nùtans**, L. (Musk Thistle.) Biennial; leaves decurrent, sinuate, spiny; heads solitary, drooping; flowers purple. — Fields near Harrisburg, Pa., *Prof. Porter*. (Adv. from Eu.)

### 81. ONOPÓRDON, Vaill. Cotton or Scotch Thistle.

Receptacle deeply honeycombed, not setose. Pappus not plumose. Otherwise as Cnicus. — Coarse, branching annuals, or biennials, with the stems winged by the decurrent base of the lobed and toothed somewhat prickly leaves. Heads large; flowers purple. (The ancient Greek name of the plant.)

**O. Acánthium**, L. Stem (2–4° high) and leaves cotton-woolly; scales linear-awl-shaped. — Roadsides and waste places in the Atlantic States; rather rare. July–Sept. (Adv. from Eu.)

### 82. CENTAURÈA, L. Star-Thistle.

Heads many-flowered; flowers all tubular, the marginal often much larger (as it were radiate) and sterile. Receptacle bristly. Involucre ovoid or globose, imbricated, the scales margined or appendaged. Achenes obovoid or oblong, attached obliquely at or near the base; pappus setose or partly chaffy or none. — Herbs with alternate leaves and single heads. (Named from the *Centaur*, Chiron, famous for his skill in healing.)

* *Achenes terete*, 10-*dentate; pappus of* 10 *long bristles and* 10 *short inner ones.*

**C. benedícta**, L. Low branching annual, with clasping scarcely pinnatifid cut leaves, and large sessile leafy-bracted heads; flowers yellow. (Cnicus benedictus, *L.*) — Roadsides and waste grounds, S. Atlantic States; rare. (Adv. from Eu.)

* * *Achenes compressed or* 4-*angled; pappus very short or none.*

**C. Cỳanus**, L. (Bluebottle.) Scales of the globular involucre fringe-margined; *false rays large;* pappus very short; *leaves linear, entire*, or toothed at the base; root annual. — Roadsides, escaped from gardens. July. — Flowers blue, varying to purplish or white. (Adv. from Eu.)

**C. nìgra**, L. (Knapweed.) Scales of the globular involucre appendaged, and with a black pectinately ciliate fringe; *rays wanting;* pappus very short; *leaves lanceolate*, entire, or the lower lyrate-toothed, rough; root perennial. — Waste places, E. New Eng. Aug. — Flowers purple. (Adv. from Eu.)

**C. Calcítrapa**, L. (Star-Thistle.) Stem diffusely much branched; *leaves pinnately lobed* or spinulose-toothed; heads sessile, the middle *scales of the ovoid involucre spiny;* pappus none; flowers purple; root annual. — Seaports, N. Y., and southward. (Adv. from Eu.)

**C. Jácea**,* L. Like the last; heads rather larger, the brownish scale-appendages lacerate; rays conspicuous, palmate. — Charlotte, Vt. (*Pringle*); near N. Y., etc., on ballast. (Nat. from Eu.)

### 83. LÁMPSANA, Tourn. Nipple-wort.

Heads 8–12-flowered. Scales of the cylindrical involucre 8, erect, in one row. Receptacle naked. Achenes oblong; pappus none. — Slender branching annuals, with angled or toothed leaves, and loosely panicled small heads; flowers yellow. (The λαμψάνη of Dioscorides was evidently a wild Mustard.)

**L. commùnis**, L. Nearly smooth, 1–2° high; lower leaves ovate, sometimes lyre-shaped. — Roadsides, N. Eng. to N. Y. and Penn. (Nat. from Eu.)

### 84. KRÍGIA, Schreber. Dwarf Dandelion.

Heads several–many-flowered. Involucral scales several, in about 2 rows, thin. Achenes short and truncate, top-shaped or columnar, terete or angled;

pappus double, the outer of thin pointless chaffy scales, the inner of delicate bristles. — Small herbs, branched from the base; the leaves chiefly radical, lyrate or toothed; the small heads terminating the naked scapes or branches. Flowers yellow. (Named after *D. Krieg*, an early German botanical collector in this country.)

§ 1. KRIGIA proper. *Achenes turbinate, 5-angled; pappus of* 5 – 7 *short roundish chaff and as many alternating bristles. Annual.*

1. **K. Virgínica,** Willd. Stems or scapes several (1 – 10′ high), becoming branched and leafy; earlier leaves roundish and entire, the others narrower and often pinnatifid. — New Eng. to Minn., and southward. April – Aug.

§ 2. CÝNTHIA. *Achenes more slender; pappus of* 10 – 15 *small oblong chaff and* 15 – 20 *bristles. Perennial.*

2. **K. Dandélion,** Nutt. Roots slender, tuberiferous; *scapes leafless*, 6 – 18′ high; leaves varying from spatulate-oblong to linear-lanceolate, entire or few-lobed. (Cynthia, *DC.*) — Moist ground, Md. to Ky., and southward. March – July.

3. **K. amplexicàulis,** Nutt. *Roots fibrous; stem-leaves* 1 – 3, oblong or oval, clasping, mostly entire; the radical ones on short winged petioles, often toothed, rarely pinnatifid; peduncles 2 – 5. (Cynthia Virginica, *Don.*) — Moist banks, Conn. to Minn., and southward. June. — Stem 1 – 2° high.

## 85. CICHÒRIUM, Tourn. SUCCORY OR CHICORY.

Heads several-flowered. Involucre double, herbaceous, the inner of 8 – 10 scales, the outer 5, short and spreading. Achenes striate; pappus of numerous small chaffy scales, forming a short crown. — Branching perennials, with deep roots; the sessile heads 2 or 3 together, axillary and terminal. Flowers bright blue, varying to purple or pink, showy. (Altered from the Arabian name of the plant.)

**C.** ÍNTYBUS, L. Stem-leaves oblong or lanceolate, partly clasping, the lowest runcinate, those of the rigid flowering branches minute. — Roadsides; N. Eng. to Iowa and Minn. July – Oct. (Nat. from Eu.)

## 86. TRAGOPÒGON, L. GOAT'S-BEARD.

Heads many-flowered. Involucre simple, of several erect lanceolate attenuate equal scales. Achenes narrowly fusiform, 5 – 10-ribbed, long-beaked; pappus of numerous long-plumose bristles. — Stout glabrous biennials or perennials, with entire grass-like clasping leaves and large solitary heads of yellow or purple flowers. (Name from τράγος, *goat*, and πώγων, *beard*.)

**T.** PORRIFÒLIUS, L. (SALSIFY. OYSTER-PLANT.) Stem 2 – 3° high; peduncle thickened and fistulous below the head; flowers purple; achenes and pappus 3′ long. — Sparingly escaped from cultivation. (Nat. from Eu.)

**T.** PRATÉNSIS, L. (GOAT'S-BEARD.) Very similar; leaves somewhat broader at base; peduncle little thickened; flowers yellow. — Fields, etc., N. Eng. to N. J. and Minn. (Nat. from Eu.)

## 87. LEÓNTODON, L., Juss. HAWKBIT.

Heads many-flowered. Involucre scarcely imbricated, but with several bractlets at the base. Achenes spindle-shaped, striate, all alike; pappus persistent, composed of plumose bristles which are enlarged and flattened toward the base. — Low and stemless perennials, with toothed or pinnatifid root-leaves, and scapes bearing one or more yellow heads. (Name from λέων, *a lion*, and ὀδούς, *a tooth*, in allusion to the toothed leaves.) — The following belongs to the subgenus OPORÍNIA, with a tawny pappus of a single row of equal bristles.

**L. autumnàlis**, L. (FALL DANDELION.) Leaves laciniate-toothed or pinnatifid, somewhat pubescent; scape branched, 5-15′ high; peduncles thickened at the summit, scaly-bracteate. — Meadows and roadsides; N. Eng. to Penn. June-Nov. (Nat. from Eu.)

## 88. PÍCRIS, L.

Heads many-flowered, terminating leafy stems. Outer scales loose or spreading. Achenes terete, with 5-10 rugose ribs; pappus of 1 or 2 rows of plumose bristles. — Coarse rough-bristly annuals or biennials, with yellow flowers. (The Greek name of some allied bitter herb, from πικρός, *bitter*.)

**P. hieracioìdes**, L. Rather tall, corymbosely branched, the bristles somewhat barbed at tip; leaves lanceolate or broader, clasping, irregularly toothed; achenes oblong, with little or no beak. — Sparingly introduced. (Nat. from Eu.)

## 89. HIERÀCIUM, Tourn. HAWKWEED.

Heads 12-many-flowered. Involucre more or less imbricated. Achenes short, oblong or columnar, striate, not beaked; pappus a single row of tawny and fragile capillary rough bristles. — Hispid or hirsute and often glandular perennials, with entire or toothed leaves, and single or panicled heads of mostly yellow flowers; summer and early autumn. (Name from ἱέραξ, *a hawk*.)

§ 1. *Involucre not much imbricate, scarcely calyculate; achenes oblong; pappus not copious.*

**H. aurantìacum**, L. Low, long-hirsute, above hispid and glandular, the involucral hairs dark; leaves all near the base of the simple peduncle; heads clustered; flowers deep orange to flame-color. — Roadsides and fields; N. Eng. to N. Y. (Nat. from Eu.)

**H. præáltum**, Vill. Glaucous, 2° high, only the base and lanceolate leaves hairy; heads in an open cyme; flowers yellow. — N. New York (*Ward*). (Nat. from Eu.)

§ 2. *Heads large; involucre irregularly imbricated; achenes columnar; pappus copious, unequal.*

**H. muròrum**, L. Stem scape-like, low; leaves oval or oblong, obtuse, toothed toward the subcordate base; heads few, dark-glandular. — Open woods near Brooklyn, N. Y. (Nat. from Eu.)

1. **H. Canadénse**, Michx. Stems simple, leafy, corymbed at the summit (1-3° high); leaves sessile, lanceolate or ovate-oblong, acute, remotely and very coarsely toothed, somewhat hairy, the uppermost slightly clasping. — Dry woods, N. Eng. to Penn., Minn., and northward.

§ 3. *Heads small; involucre cylindrical, scarcely imbricated.*

* *Achenes columnar, not attenuate upward when mature; panicle not virgate.*

2. **H. paniculàtum**, L. *Stem slender, leafy, diffusely branched*, hairy only below (1-3° high); leaves lanceolate, acute at both ends, slightly toothed, smooth; *heads* (very small) *in a loose panicle*, on slender and diverging pedicels, 12-20-*flowered; achenes short.* — Open woods; rather common.

3. **H. venòsum**, L. (RATTLESNAKE-WEED.) Stem or *scape* (1-2° high) *naked or with a single leaf, smooth and slender, forking above into a spread-*

*ing loose corymb;* leaves all radical or near the base, obovate or oblong, nearly entire, scarcely petioled, thin and pale, purplish and glaucous underneath (often hairy along the midrib), marked above with purple veins; pedicels very slender; involucre 12–35-flowered; *achenes linear.* — Dry plains and pine woods; common from the Atlantic to Minn. and Iowa.

4. **H. Mariànum,** Willd. *Somewhat leafy,* 2–3° high, hairy below; leaves obovate-oblong, narrowed below, *the radical petiolate, rarely purplish-veiny;* heads 20–40-flowered in a very open cymose panicle, *the slender inflorescence commonly whitish-tomentulose and sparingly glandular-hispid.* — Open woods and clearings; R. I. to western N. Y., and southward. — Var. SPATHULÀTUM, Gray, a mountain form with leaves all or mainly radical and very hairy. On Two-top Mountain, Penn.

5. **H. scàbrum,** Michx. Stem rather stout (1–3° high), leafy, *rough-hairy,* the stiff panicle at first racemose, at length rather corymbose; the thickish pedicels and the hoary 40–50-flowered involucre densely clothed with dark glandular bristles; leaves obovate or oval, nearly entire, hairy. — Dry open woods; common.

* * *Achenes tapering upward; heads* 15–30-*flowered in a narrow or virgate panicle.*

6. **H. Gronòvii,** L. (HAIRY H.) Stem wand-like, mostly simple (1–3° high), *leafy and very hairy below, naked above* and forming a long and narrow panicle; leaves oblong or obovate, nearly entire, hairy; slender peduncles and involucre sparingly glandular-bristly; *achenes with a very taper summit.* — Dry sterile soil; common, especially southward.

7. **H. longípilum,** Torr. (LONG-BEARDED H.) Stem wand-like, simple, stout (2–3° high), *very leafy toward the base, naked above,* and bearing a small racemed panicle; the lower portion and both sides of the oblong-lanceolate or spatulate entire leaves thickly *clothed with very long and upright bristles* (often 1′ long); peduncles and involucre glandular-bristly; *achenes narrowed at the apex.* — Prairies, Mich. to Minn., and southwestward.

## 90. CRÈPIS, L.

Involucre few–many-flowered, commonly of a single row of equal scales, often becoming thickened at base. Pappus copious, white and soft. Annuals or biennials, not pilose. Otherwise as Hieracium. (The Greek name of some plant, from κρηπίς, *a sandal.*)

**C.** BIÉNNIS, L. Somewhat pubescent, 2° high, leafy; leaves runcinate-pinnatifid; heads rather large, corymbose; achenes oblong, glabrous. — Vt., Mass.; rare. (Nat. from Eu.)

**C.** TECTÒRUM, L. Slender, branching from the base, 1° high; leaves narrow, runcinate; heads small, in a loose panicle; achenes fusiform, the ribs scabrous. — In fields, Lansing, Mich., and on ballast. (Nat. from Eu.)

## 91. PRENÁNTHES, Vaill. RATTLESNAKE-ROOT.

Heads 5–30-flowered. Involucre cylindrical, of 5 to 14 linear scales in a single row, and a few small bractlets at base. Achenes short, linear-oblong, striate or grooved, not contracted at the apex. Pappus of copious straw-color or brownish and rough capillary bristles. — Perennial herbs, with upright leafy stems arising from spindle-shaped (extremely bitter) tubers, very variable leaves, and racemose-panicled mostly nodding heads. Flowers greenish-white or yellowish, often tinged with purple; late summer and autumn. Our species belong to the subgenus *Nábalus*. The original European species has soft white pappus. (Name from πρηνής, *drooping*, and ἄνθη, *blossom*.)

* *Heads rather broad, 25 – 35-flowered, in a corymbose panicle.*

1. **P. crepidínea**, Michx. Somewhat smooth; stem stout (5 – 9° high), bearing numerous nodding heads in loose clusters; leaves large (6 – 12′ long), broadly triangular-ovate or halberd-form, strongly-toothed, contracted into winged petioles; pappus brown. (Nabalus, *DC.*) — Rich soil, Penn. and western N. Y. to Minn., and southward. — Flowers cream-color.

* * *Heads narrow, 8 – 15-flowered, in a long raceme-like or thyrsoid inflorescence; stems simple; cauline leaves sessile; pappus straw-color.*

+- *Inflorescence pubescent, strict; heads nearly erect, 12 – 15-flowered.*

2. **P. racemòsa**, Michx. Stem 2 – 5° high, smooth and glaucous, as well as the oval or oblong-lanceolate denticulate leaves; the lower tapering into winged petioles (rarely cut-pinnatifid), the upper partly clasping; heads in crowded clusters; flowers purplish. (Nabalus, *DC.*) — Plains, N. Maine to N. J., Mo., and northward. — Var. PINNATÍFIDA, Gray, the leaves all lyrately pinnatifid. Hackensack marshes, N. J.

3. **P. áspera**, Michx. Stem 2 – 4° high, rough-pubescent, as well as the oval-oblong or broadly lanceolate toothed leaves; upper leaves not clasping; heads in small clusters; flowers larger, cream-color. (Nabalus asper, *Torr. & Gray.*) — Dry prairies and barrens, Ohio to Iowa, and southward.

+- +- *Whole plant glabrous; heads nodding, 8 – 12-flowered; thyrse looser.*

4. **P. virgàta**, Michx. (SLENDER RATTLESNAKE-ROOT.) Slightly glaucous; stem 2 – 4° high, prolonged into a naked and slender spiked raceme ($1\frac{1}{2}$ – 2° long); heads clustered and mostly unilateral; leaves lanceolate, acute, closely sessile, the upper reduced to bracts, the lower toothed or pinnatifid; involucre (purplish) of about 8 scales. (Nabalus, *DC.*) — Sandy pine barrens, N. J. to Va., and southward.

5. **P. Mainénsis**, Gray. Stem 2° high, leafy; leaves as in n. 2, but the radical ovate and more abruptly narrowed to the short petiole; heads persistently drooping on slender pedicels. — St. John's River, N. Maine (*Pringle*). Perhaps a hybrid between n. 2 and 7.

* * * *Heads 5 – 18-flowered, racemose or paniculate, commonly pendulous; leaves variable, mostly petiolate, the lower cordate or truncate or hastate at base.*

+- *Involucre cylindrical; scales scarious-margined, the outer very short, appressed.*

++ *Pappus reddish-brown; stem tall, generally purplish.*

6. **P. álba**, L. (WHITE LETTUCE. RATTLESNAKE-ROOT.) Smooth and glaucous (2 – 4° high); stem corymbose-panicled at the summit; leaves angulate or triangular-halberd-form, sinuate-toothed or 3 – 5-cleft, the uppermost oblong and undivided; involucre (purplish) of about 8 scales, 8 – 12-flowered. (Nabalus, *Hook.*) — Borders of rich woods; common, especially northward.

++ ++ *Pappus dirty straw-color or whitish; leaves very variable.*

7. **P. serpentària**, Pursh. (LION'S-FOOT. GALL-OF-THE-EARTH.) Nearly smooth; stem corymbose-panicled at the summit, commonly 2° high; leaves

mostly deltoid, roughish; the lower variously 3 – 7-lobed, on margined petioles; the upper oblong-lanceolate, mostly undivided, nearly sessile; involucre (greenish, rarely purplish, sometimes slightly bristly) of about 8 scales, 8 – 12-flowered; flowers purplish, greenish white, or cream-color. (Nabalus Fraseri, *DC.*) — Dry sandy or sterile soil, New Eng. to Va., and southward.

Var. **nàna,** Gray. Stem more simple and strict, 6 – 16′ high, smooth and glabrous; inflorescence contracted, the clusters often sessile in most of the axils. (Nabalus nanus, *DC.*) — Mountains of northern N. Eng. and N. Y., and northeastward.

8. **P. altíssima,** L. Smooth; stem tall and slender (3 – 7° high); the heads in small axillary and terminal loose clusters forming a long and wand-like leafy panicle; leaves membranaceous, all petioled, ovate, heart-shaped, or triangular, and merely toothed or cleft, with naked or winged petioles, or frequently 3 – 5-parted, with the divisions entire or again cleft; involucre slender (greenish), of 5 scales, 5 – 6-flowered. (Nabalus, *Hook.*) — Rich moist woods; N. Eng. to Minn., and southward in the mountains to Ga.

+ + *Involucre campanulate-oblong; secondary basal scales* 2 – 3, *linear, loose.*

9. **P. Boòttii,** Gray. Stem simple, dwarf (5 – 6′ high), pubescent at the summit; the heads in an almost simple raceme; lowest leaves halberd-shaped or heart-shaped, the middle oblong, the upper lanceolate, nearly entire, tapering into a margined petiole; involucre (livid) 10 – 18-flowered, the proper scales 10 – 15, very obtuse; pappus straw-color. — Alpine region, mountains of Maine, N. H., and N. New York.

## 92. LYGODÉSMIA, Don.

Heads and flowers (5 – 10) nearly as in Nabalus; the cylindrical involucre more elongated, and the achenes long and slender, tapering at the summit; pappus whitish. — Smooth, often glaucous, low perennials, with single erect heads of rose-purple flowers terminating almost leafless or rush-like stems or branches. (Name composed of λύγος, *a pliant twig*, and δέσμη, *a bundle*, from the fascicled twiggy or rush-like stems.)

1. **L. júncea,** Don. Stems (1° high) tufted, branched, striate; lower leaves lance-linear, 1 – 2′ long, rigid, the upper awl-shaped and minute, heads 5-flowered. — St. Croix River, Wisc., to Kan., and westward. July.

## 93. TRÓXIMON, Nutt.

Head large, solitary, many-flowered. Scales of the bell-shaped involucre ovate or lanceolate, pointed, loosely imbricated in 2 or 3 rows. Achenes smooth, 10-ribbed, with distinct beak or none; pappus longer than the achene, white, of copious and unequal rigid capillary bristles. — Perennial scapose herbs, with elongated linear tufted root-leaves, and yellow flowers. (Name probably from τρώγω, *to chew*, of no obvious application.)

1. **T. cuspidàtum,** Pursh. Scape 1° high, from a thickened caudex, leaves lanceolate, elongated, tapering to a sharp point, entire, woolly on the margins; scales of the involucre lanceolate, sharp-pointed, achene beakless — Prairies, Wisc., N. Ill., and westward. April, May.

2. **T. glaùcum,** Nutt. Scape 1 – 2° high; leaves linear to lanceolate, entire to dentate or laciniate; head often pubescent or villous; achene long-beaked. — Minn. to Neb. and southwestward.

### 94. TARÁXACUM, Haller. DANDELION.

Head many-flowered, large, solitary on a slender hollow scape. Involucre double, the outer of short scales; the inner of long linear scales, erect in a single row. Achenes oblong-ovate to fusiform, 4 – 5-ribbed, the ribs roughened, the apex prolonged into a very slender beak, bearing the copious soft and white capillary pappus. — Perennials or biennials; leaves radical, pinnatifid or runcinate; flowers yellow. (Name from ταράσσω, *to disquiet* or *disorder*, in allusion to medicinal properties.)

**T.** OFFICINÀLE, Weber. (COMMON DANDELION.) Smooth, or at first pubescent; outer involucre reflexed. (T. Dens-leonis, *Desf.*) — Pastures and fields everywhere. Indigenous forms occur northward and in the Rocky Mountains. April – Sept. — After blossoming, the inner involucre closes, and the slender beak elongates and raises up the pappus while the fruit is forming; the whole involucre is then reflexed, exposing to the wind the naked fruits, with the pappus displayed in an open globular head. (Eu.)

### 95. PYRRHOPÁPPUS, DC. FALSE DANDELION.

Heads, etc., nearly as in Taraxacum, but the soft pappus reddish or rusty-color, and surrounded at base by a soft-villous ring. — Mostly annual or biennial herbs, scapose or often branching and leafy below. Heads solitary, terminating the naked summit of the stem or branches. Flowers deep yellow. (Name composed of πυῤῥός, *flame-colored*, and παππός, *pappus*.)

1. **P. Caroliniànus,** DC. Annual or biennial, stem branching (1 – 2° high); leaves oblong or lanceolate, entire, cut, or pinnatifid, the stem-leaves partly clasping. — Sandy fields, from Maryland southward. April – July.

2. **P. scapòsus,** DC. Low, scapose, perennial by roundish tubers; leaves all radical, pinnatifid. — Prairies; Kan. to Tex.

### 96. CHONDRÍLLA, Tourn.

Heads few-flowered. Involucre cylindrical, of several narrow linear equal scales, and a row of small bractlets at base. Achenes terete, several-ribbed, smooth below, roughened at the summit by little scaly projections, from among which springs an abrupt slender beak; pappus of copious very fine and soft capillary bristles, bright white. — Herbs of the Old World, with wand-like branching stems, and small heads of yellow flowers. (A name of Dioscorides for some plant which exudes a gum.)

**C.** JÚNCEA, L. Biennial, bristly-hairy below, smooth above (1 – 3° high); root-leaves runcinate; stem-leaves few and small, linear; heads scattered on nearly leafless branches, 6 – 8″ long. — Fields and roadsides, abundant in Md. and northern Va. Aug. (Adv. from Eu.)

### 97. LACTÙCA, Tourn. LETTUCE.

Heads several – many-flowered. Involucre cylindrical or in fruit conical; scales imbricated in 2 or more sets of unequal lengths. Achenes flat (obcompressed, parallel to the scales), abruptly contracted into a beak, which is dilated at the apex, bearing a copious and fugacious very soft and white capillary pappus, its bristles falling separately. — Leafy-stemmed herbs, with panicled heads; flowers of variable color, produced in summer and autumn. (The ancient name of the Lettuce, *L. sativa;* from *lac*, milk, in allusion to the milky juice.)

§ 1. SCARÌOLA. *Achenes very flat, orbicular to oblong, 1-nerved on each face, with a filiform beak; biennial or annual; cauline leaves sagittate-clasping.*

**L.** Scarìola, L. (Prickly Lettuce.) Stem below sparsely prickly-bristly, as also the midrib on the lower face of the oblong or lanceolate spinulose-denticulate vertical leaves; panicle narrow; heads small, 6 – 12-flowered; achenes striate. — Waste grounds and roadsides, Atlantic States to Mo. and Minn. (Adv. from Eu.)

1. **L. Canadénsis,** L. (Wild Lettuce.) Mostly tall (4 – 9° high), very leafy, smooth or nearly so, glaucous; leaves 6 – 12′ long, pale beneath, mostly sinuate-pinnatifid, the upper lanceolate and entire (rarely all but the lower narrow and entire); heads about 20-flowered, 3 – 6″ long, numerous, in long and narrow or diffuse panicles; flowers pale yellow; achene oval, rather longer than the beak. — Rich damp soil, borders of fields or thickets; common.

2. **L. integrifòlia,** Bigel. Less leafy, 3 – 4° high, loosely branched above or heads loosely panicled; leaves undivided, oblong-lanceolate, pointed, denticulate or entire; flowers yellow or purplish. (L. Canadensis, var. integrifolia, *Torr. & Gray.*) — N. Eng. to Ill., and southward.

3. **L. hirsùta,** Muhl. Rather few-leaved, 2 – 3° high, commonly hirsute at base; leaves hirsute both sides or only on the midrib, mostly runcinate-pinnatifid; heads in a loose open panicle; achenes oblong-oval, about as long as the beak; flowers yellow-purple, rarely whitish. (L. Canadensis, var. sanguinea, *Torr. & Gray.*) — E. Mass. to Minn., and southward.

4. **L. Ludovicìana,** DC. Glabrous, leafy, 2 – 5° high; leaves oblong, sinuate-pinnatifid and spinulosely dentate, ciliate; heads in an open panicle; involucre more imbricate; flowers yellow. — Minn., Iowa, and southwestward.

§ 2. LACTUCÁSTRUM. *Achenes flat, lanceolate-oblong, tapering to a short slender beak; perennial; flowers blue.*

5. **L. pulchélla,** DC. Pale or glaucous; stem simple, 1 – 2° high; leaves sessile, oblong- or linear-lanceolate, entire, or the lower runcinate-pinnatifid; heads few and large, racemose, erect on scaly-bracted peduncles; involucral scales imbricated in 3 or 4 ranks. (Mulgedium, *Nutt.*) — Upper Mich. to Minn.; common on the plains westward.

§ 3. MULGÈDIUM. *Achenes thickish, oblong, contracted into a short thick beak or neck; annual or biennial; flowers chiefly blue.*

6. **L. acuminàta,** Gray. Tall biennial (3 – 7° high), with many small heads in a loose panicle, on diverging peduncles; leaves ovate to oblong-lanceolate, pointed, sharply and sometimes doubly serrate, sometimes hairy on the midrib beneath, contracted into a winged petiole, the lowest occasionally sinuate or cleft at base, and the cauline sagittate or hastate; achenes beakless; pappus white. (Mulgedium, *DC.*) — Borders of woods, N. Y. to Ill. and Fla.

7. **L. Floridàna,** Gaertn. Leaves all lyrate or runcinate, the upper often with a heart-shaped clasping base; panicle larger; achenes distinctly beaked; otherwise as n. 6. — Rich soil, Penn. to Ill., and southward.

8. **L. leucophæa,** Gray. Nearly smooth biennial; stem tall (3–12° high), very leafy; leaves irregularly pinnatifid, sometimes runcinate, coarsely toothed, the upper cauline sessile and auriculate, sometimes clasping; heads in a large and dense compound panicle; flowers bluish to cream-color; achene short-beaked; pappus tawny. (Mulgedium, *DC.*) — Low grounds; rather common. — Var. INTEGRIFÒLIA, Gray. Leaves undivided, or the lower sinuate-pinnatifid. Ohio to Ill.

### 98. SÓNCHUS, L. Sow-Thistle.

Heads many-flowered, becoming tumid at base. Involucre more or less imbricated. Achenes obcompressed, ribbed or striate, not beaked; pappus copious, of very white exceedingly soft and fine bristles mainly falling together. — Leafy-stemmed coarse weeds, chiefly smooth and glaucous, with corymbed or umbellate heads of yellow flowers; produced in summer and autumn. (The ancient Greek name.)

* *Annual* (1–5° *high*); *flowers pale yellow.*

**S.** OLERÀCEUS, L. (Common Sow-Thistle.) Stem-leaves runcinate-pinnatifid, or rarely undivided, slightly toothed with soft spiny teeth, clasping by a heart-shaped base, the auricles acute; involucre downy when young; achenes striate, also wrinkled transversely. — Waste places in manured soil and around dwellings. (Nat. from Eu.)

**S.** ÁSPER, Vill. (Spiny-leaved S.) Stem-leaves less divided and more spiny-toothed, the auricles of the clasping base rounded; achenes margined, 3-nerved on each side, smooth. — With and like the last. (Nat. from Eu.)

* * *Perennial, with creeping rootstocks; flowers bright yellow, in large heads.*

**S.** ARVÉNSIS, L. (Field S.) Leaves runcinate-pinnatifid, spiny-toothed, clasping by a heart-shaped base; peduncles and involucre bristly; achenes transversely wrinkled on the ribs. — Roadsides, etc., N. Eng. and N. Y.; becoming more common. (Nat. from Eu.)

## Order 56. LOBELIÀCEÆ. (Lobelia Family.)

*Herbs with acrid milky juice, alternate leaves, and scattered flowers, an irregular monopetalous 5-lobed corolla, the 5 stamens free from the corolla, and united into a tube commonly by their filaments and always by their anthers.* — Calyx-tube adherent to the many-seeded pod. Style 1, stigma often fringed. Seeds anatropous, with a small straight embryo, in copious albumen. — Nearly passing into the following order.

### 1. LOBÈLIA, L.

Calyx 5-cleft, with a short tube. Corolla with a straight tube, split down on the (apparently) upper side, somewhat 2-lipped: the upper lip of 2 rather erect lobes, the lower lip spreading and 3-cleft. Two of the anthers in our species bearded at the top. Pod 2-celled, many-seeded, opening at the top. — Flowers axillary or chiefly in bracted racemes, in summer and early autumn. (Dedicated to *Matthias De l'Obel*, an early Flemish herbalist.)

* *Flowers deep red, large; stem simple.*

1. **L. cardinàlis,** L. (Cardinal-flower.) Tall (2–4° high), smoothish; leaves oblong-lanceolate, slightly toothed; raceme elongated, rather 1-sided; the pedicels much shorter than the leaf-like bracts. — Low grounds, common.

— Perennial by offsets, with large and very showy intensely red flowers, varying rarely to rose-color or even white. Hybrids with the next species also occur.

∗ ∗ *Flowers blue, or blue variegated with white.*

+ *Flowers rather large* (*corolla-tube* 5 – 6″ *long*), *spicate-racemose; stems leafy,* 1 – 3° *high; perennial.*

++ *Leaves ovate to lanceolate, numerous; lip of corolla glabrous.*

2. **L. syphilítica,** L. (Great Lobelia.) *Somewhat hairy; leaves thin, acute at both ends* (2 – 6′ long), irregularly serrate; flowers (nearly 1′ long) pedicelled, longer than the leafy bracts; calyx hirsute, the *sinuses with conspicuous deflexed auricles,* the short *tube hemispherical.* — Low grounds, common. — Flowers light blue, rarely white.

3. **L. pubérula,** Michx. *Finely soft-pubescent; leaves thickish, obtuse* (1 – 2′ long), with small glandular teeth; spike rather 1-sided; bracts ovate; *sinuses of the calyx with short and rounded or often inconspicuous auricles, the hairy tube top-shaped.* — Moist sandy grounds, N. J. to Iowa, and south to Tex. and Fla. — Corolla bright blue, ½′ long.

4. **L. amœna,** Michx. *Glabrous* or nearly so; raceme virgate; leaves narrower; bracts lanceolate or linear, often glandular-denticulate; calyx-lobes long and very slender, usually without auricles, the tube glabrous. — S. Atlantic States, in swamps. — Var. glandulífera, Gray; a slender form with secund raceme, oval to lance-oblong obtuse gland-toothed leaves, and the bracts and calyx-teeth beset with slender gland-tipped teeth. S. Va. and southward.

++ ++ *Leaves long and narrow, sparse above; lip of corolla pubescent at base.*

5. **L. glandulòsa,** Walt. Glabrous, or sparingly pubescent; leaves, bracts, and usually the lobes of the calyx, strongly glandular-toothed; calyx-tube densely hispid, rarely sparsely so or smoothish, the sinuses not auriculate. — Pine-barren swamps, S. Va. to Fla.

+ + *Flowers smaller* (*corolla-tube not more than* 2 – 3″ *long*).

++ *Stem leafy, mostly simple, continued into an elongated virgate spike-like raceme; leaves lanceolate to obovate, barely denticulate or repand.*

6. **L. leptóstachys,** A. DC. Smooth above; leaves obtuse, denticulate, oblong-lanceolate, the upper gradually reduced to awl-shaped bracts; calyx-lobes nearly equalling the corolla, with 10 *reflexed awl-shaped appendages as long as the hemispherical tube.* — Sandy soil, Ohio to Ill. and Mo.; also Va. to Ga.

7. **L. spicàta,** Lam. Stem slender, *strict* (1 – 4° high) from a biennial (?) root, below and the barely denticulate leaves minutely pubescent; lower and root-leaves obovate or spatulate, the upper reduced to linear or club-shaped bracts; calyx-tube short, obconical or becoming almost hemispherical, *sinuses not appendaged.* — Moist or dry, mostly gravelly or sandy soil, N. New Eng. to Sask., south to Ark. and La. Fl. through summer. — Var. parviflòra, Gray, a small form, with calyx-lobes broadly subulate, and pale corolla but 3″ long. Swamps, Lancaster, Penn. (*Porter*); beginning to flower in June. — Var. hirtélla, Gray; with somewhat scabrous pubescence, and minutely hirsute-ciliate bracts and calyx-lobes. Chiefly toward and beyond the Mississippi.

++ ++ *Stem leafy, often paniculately branched; flowers loosely racemose; sinuses of calyx not appendaged; annual or biennial.*

= *Leaves chiefly linear, entire or denticulate; pod not inflated.*

8. **L. Cánbyi,** Gray. Stem strict (1 – 2° high), minutely angled; *pedicels shorter than the bracts and flowers,* minutely roughened under a lens; *bractlets none; calyx-tube top-shaped, acute at base, only half the length of the lobes* (which, with the linear leaves, are sparsely glandular-denticulate), in fruit becoming oblong, covering the whole pod; corolla deep blue (fully 5″ long), more or less *bearded in the throat.* — Wet places, N. J., Del., and S. C.

9. **L. Kálmii,** L. Stem mostly low (4 – 18′ high), minutely angled; *pedicels filiform, not exceeding* the linear or setaceous *bracts but as long as the flower, minutely 2-bracteolate or 2-glandular above the middle; calyx-tube top-shaped or obovoid,* fully half the length of the lobes, in fruit rather longer than they, covering the whole pod; corolla light blue, 4 – 5″ long. — Wet limestone rocks and banks, N. Eng. to L. Winnipeg, south to Penn., Ind., and Minn.

10. **L. Nuttàllii,** Roem. & Schult. Stem very slender (1 – 2° high), terete; *pedicels mostly longer than the bract and shorter than the flower,* usually with very minute bractlets near the base; *calyx-tube very short, depressed-hemispherical in fruit,* the globular pod half free; corolla pale blue, barely 3″ long. — Sandy swamps, N. J. and Penn. to Ga.

= = *Leaves ovate or oblong, obtusely toothed; pod inflated, wholly inferior.*

11. **L. inflàta,** L. (INDIAN TOBACCO.) Stems paniculately much branched from an annual root, pubescent with spreading hairs (1 – 2° high); leaves gradually diminishing into leaf-like bracts, which exceed the lower short-pedicelled flowers; calyx-tube ovoid. — Dry open fields. — Corolla only 1½ – 2″ long. Plant poisonous and a noted quack medicine.

++ ++ ++ *Stem scape-like, mostly simple, hollow; leaves fleshy; fibrous-rooted perennials, very glabrous, mostly aquatic, with pale blue or whitish flowers.*

12. **L. paludòsa,** Nutt. Nearly smooth; stem slender (1 – 4° high); *leaves flat, scattered near the base, linear-spatulate* or oblong-linear, glandular-denticulate, mostly tapering into a petiole; lower lip of corolla bearded in the middle; calyx-tube about half the length of the short lobes, hemispherical in fruit. — In water (but foliage emerged), Del. to Fla. and La.

13. **L. Dortmánna,** L. (WATER LOBELIA.) Very smooth; *scape thickish* (5 – 12′ high), *few-flowered; leaves all tufted at the root, linear, terete, hollow,* with a partition lengthwise; lower lip of corolla slightly hairy; calyx-tube about as long as the lobes, in fruit much longer. — Borders of ponds (often immersed), N. Eng. to N. Penn., L. Superior, and northward. (Eu.)

## ORDER 57. CAMPANULÀCEÆ. (CAMPANULA FAMILY.)

*Herbs, with milky juice, alternate leaves, and scattered flowers. calyx adherent to the ovary; the regular 5-lobed corolla bell-shaped, valvate in the bud; the 5 stamens usually free from the corolla and distinct.* — Style 1, usually beset with collecting hairs above; stigmas 2 or more. Capsule 2 – several-celled, many-seeded. Seed small, anatropous, with a straight embryo in fleshy albumen. Flowers generally blue and showy.

### 1. SPECULÀRIA, Heister. VENUS'S LOOKING-GLASS.

Calyx 5- (or 3–4-) lobed. Corolla wheel-shaped, 5-lobed. Stamens 5, separate; the membranaceous hairy filaments shorter than the anthers. Stigmas 3. Capsule prismatic or elongated-oblong, 3-celled, opening by 3 small lateral valves. — Low annuals, with axillary blue or purplish flowers, in American species dimorphous, the earlier being cleistogamous. (Name from *Speculum Veneris,* the early name of the common European species.)

1. **S. perfoliàta,** A. DC. Somewhat hairy (3–20′ high); *leaves roundish or ovate, clasping by the heart-shaped base,* toothed; flowers sessile, solitary or 2–3 together in the axils, only the upper or later ones having a conspicuous and expanding corolla; *capsule oblong, short, straight, opening rather below the middle;* seeds lenticular. — Sterile open ground; common. May–Aug.

2. **S. leptocárpa,** Gray. Minutely hirsute or nearly glabrous (6–12′ high); *leaves lanceolate,* with flowers closely sessile in their axils; calyx-lobes of lower flowers 3; *capsule nearly cylindrical* (6–9″ *long,* 1″ *thick*), *inclined to curve, opening by one or two uplifted valves near the summit;* seeds oblong. — W. Mo. and Ark. to Col. and W. Tex. Expanded corolla 6–9″ wide.

### 2. CAMPÁNULA, Tourn. BELLFLOWER.

Calyx 5-cleft. Corolla generally bell-shaped, 5-lobed. Stamens 5, separate; the filaments broad and membranaceous at the base. Stigmas and cells of the capsule 3 in our species, the short pod opening on the sides by as many valves or holes. — Herbs, with terminal or axillary flowers; in summer. (A diminutive of the Italian *campana,* a bell, from the shape of the corolla.)

* *Style straight; openings of capsule below the middle.*

+ *Coarse pubescent many-flowered European species, sparingly naturalized; perennial.*

**C.** RAPUNCULOÌDES, L. Smoothish, slender, erect; stem-leaves ovate-lanceolate, pointed, the lower long-petioled and heart-shaped; flowers nodding, single in the axil of bracts, forming racemes; corolla oblong, 1′ long. — Roadsides and fields, Canada and N. Eng. to Penn.

**C.** GLOMERÀTA, L. (CLUSTERED B.) Somewhat hairy, stout and erect, 1° high; stem-leaves oblong or lanceolate, cordate-clasping; flowers sessile, clustered in the upper axils, forming a leafy head; corolla open-bell-shaped, 1′ long. — Roadsides, E. Mass.

+ + *Slender perennials, mostly glabrous; flowers one or few, on slender peduncles.*

1. **C. rotundifòlia,** L. (HAREBELL.) Slender, branching (5–12′ high), 1–10-flowered; *root-leaves round-heart-shaped* or ovate, mostly toothed or crenate, long-petioled, early withering away; *stem-leaves* numerous, *linear or narrowly lanceolate, entire, smooth; calyx-lobes awl-shaped,* from ½ to ⅔ the length of the bright-blue corolla (which is 6–9″ long); *capsule nodding.* — Rocky shaded banks, throughout the northern part of our range, and southward in the mountains. — A delicate and pretty species, but with a most inappropriate name, since the round root-leaves are rarely obvious. (Eu.)

Var. **árctica,** Lange. Stems more upright and rather rigid; lowest leaves spatulate; the very slender calyx-lobes soon spreading or deflexed; corolla ⅔–1′ long. (C. rotundifolia, var. linifolia, *of Man.*) — Shores of the Great Lakes, and northward. (Eu.)

Var. **velutina,** DC., has the whole herbage canescently pubescent. — Sand-hills of Burt Lake, Mich. (*E. J. Hill*).

2. **C. aparinoides,** Pursh. (MARSH BELLFLOWER.) *Stem simple and slender, weak* (8 – 20′ high), few-flowered, somewhat 3-angled, *rough backward on the angles, as are the* slightly toothed *edges and midrib of the linear-lanceolate leaves; peduncles diverging,* slender; *lobes of the calyx triangular,* half the length of the bell-shaped nearly white corolla; *capsule erect.* — Wet grassy grounds, throughout our range. With somewhat the habit of a Galium.

3. **C. divaricàta,** Michx. Very smooth; stem loosely branched (1 – 3° high); *leaves oblong-lanceolate,* pointed at both ends, *coarsely and sharply toothed; flowers numerous* on the branches of the large compound panicle; *calyx-lobes awl-shaped,* about half the length of the pale-blue small corolla (3″ long); style exserted. — Dry woods and rocks, mountains of Va., E. Ky., and southward.

* * *Style declined and upwardly curved, much longer than the rotate corolla; openings of the capsule close to the summit; inflorescence spicate.*

4. **C. Americàna,** L. (TALL BELLFLOWER.) Annual; stem mostly simple (3 – 6° high); leaves ovate and ovate-lanceolate, taper-pointed, serrate, mostly on margined petioles, thin, somewhat hairy (2½ – 6′ long); spike 1 – 2° long; corolla light blue, 1′ broad. — Moist rich soil, western N. Y. to Minn., south to Ga. and Ark.

## ORDER 58. ERICÀCEÆ. (HEATH FAMILY.)

*Shrubs, sometimes herbs, with the flowers regular or nearly so; stamens as many or twice as many as the* 4 – 5-*lobed or* 4 – 5-*petalled corolla, free from but inserted with it: anthers* 2-*celled, commonly appendaged, or opening by terminal chinks or pores, introrse* (except in Suborder 3); *style* 1; *ovary* 3 – 10-*celled.* Pollen compound, of 4 united grains (except in Suborder 4). Seeds small, anatropous. Embryo small, or sometimes minute, in fleshy albumen. — A large family, very various in many of the characters, comprising four well-marked suborders, as follows: —

SUBORDER I. **Vaccinieæ.** (WHORTLEBERRY FAMILY.) Calyx-tube adherent to the ovary, which forms an edible berry or berry-like fruit, crowned with the short calyx-teeth. Anther-cells opening at the apex. — Shrubs or somewhat woody plants, with scaly buds.

1. **Gaylussacia.** Ovary 10-celled, with a single ovule in each cell. Fruit a berried drupe with 10 small seed-like nutlets.
2. **Vaccinium.** Berry 4 - 5-celled (or imperfectly 8 - 10-celled by false partitions), many-seeded. Anther-cells tapering upward into a tube.
3. **Chiogenes.** Berry 4-celled, many-seeded, its summit free. Anther-cells not prolonged into a tube, but each 2-pointed. Slender trailing evergreen.

SUBORDER II. **Ericineæ.** (HEATH FAMILY proper.) Calyx free from the ovary. Corolla gamopetalous, rarely polypetalous, hypogynous. — Shrubs or small trees.

**Tribe I. ARBUTEÆ.** Fruit indehiscent, a berry or drupe. Corolla deciduous.

4. **Arctostaphylos.** Corolla urn-shaped. Drupe berry-like, 5 - 10-seeded.

**Tribe II. ANDROMEDEÆ.** Fruit a loculicidal capsule (berry-like in n. 6). Corolla deciduous.

* Anther-cells opening through their whole length, not appendaged.

5. **Epigæa.** Corolla salver-shaped. Calyx of 5 separate dry and pointed sepals.

* * Anther-cells opening only at the top. Corolla not salver-shaped.

+ Calyx becoming enlarged and berry-like in fruit.

6. **Gaultheria.** Calyx 5-cleft, in fruit enclosing the capsule. Anthers 4-awned at top.

+ + Calyx dry, not becoming fleshy after flowering.

++ Corolla urceolate to cylindrical, 5-toothed; not heath-like.

7. **Andromeda.** Calyx valvate and very early open, naked. Capsule globular. Seeds mostly hanging on the central placenta.
8. **Oxydendrum.** Calyx short, early open, naked. Capsule oblong-pyramidal. Seeds all ascending. A small tree.
9. **Leucothoe.** Calyx slightly or much imbricated, naked or bibracteate. Corolla cylindraceous. Capsule depressed, 5-lobed, the valves entire.
10. **Cassandra.** Calyx of rigid imbricated ovate sepals, bibracteate. Corolla cylindraceous. Capsule splitting when ripe into an outer and inner layer, the inner of 10 valves.

++ ++ Corolla campanulate, 4-5-lobed or -parted; heath-like, with acerose imbricated leaves.

11. **Cassiope.** Calyx of ovate imbricated sepals. Capsule globular-ovoid, 4-5-valved, the valves 2-cleft.

**Tribe III. ERICEÆ.** Corolla persistent, becoming scarious. Capsule septicidal.

12 **Calluna.** Corolla bell-shaped, 4-parted. Leaves minute, opposite, imbricate.

**Tribe IV. RHODODENDREÆ.** Fruit a septicidal capsule. Corolla deciduous.

* Anther-cells opening by a hole or chink at the top.

+ Flowers not from scaly buds; the bracts leaf-like or coriaceous.

13. **Bryanthus.** Corolla ovate or urn-shaped. Leaves narrow and heath-like.
14. **Kalmia.** Corolla broadly bell-shaped or wheel-shaped, with 10 pouches receiving as many anthers. Leaves oblong or linear.

+ + Flowers developed from large scaly buds, the scales or bracts caducous.

15. **Menziesia.** Corolla globular-bell-shaped, 4-toothed. Stamens 8. Leaves deciduous.
16. **Rhododendron.** Flowers usually 5-merous. Corolla bell-shaped or funnel-form, lobed or parted, often somewhat irregular Leaves deciduous or evergreen.
17. **Ledum.** Corolla regular, all 5 petals nearly separate. Stamens 5-10. Leaves evergreen.

* * Anther-cells opening lengthwise. Leaves evergreen. Bud-scales firm and persistent.

18. **Leiophyllum.** Corolla of 5 separate petals Stamens 10, exserted.
19. **Loiseleuria.** Corolla deeply 5-cleft. Stamens 5, included.

SUBORDER III. **Pyroleæ.** (PYROLA FAMILY.) Calyx free from the ovary. Corolla polypetalous. Anthers extrorse in the bud, opening by pores at the base (inverted in the flower). Seeds with a loose and translucent cellular coat much larger than the nucleus.

**Tribe I. CLETHREÆ.** Shrubs or trees, with deciduous foliage (in ours). Pollen-grains simple. Capsule 3-celled.

20. **Clethra.** Sepals and petals 5. Stamens 10. Style 3-cleft at the apex.

**Tribe II. PYROLEÆ.** Herbs or nearly so, with evergreen foliage. Pollen-grains compound. Capsule 5- (rarely 4-) celled.

21. **Chimaphila.** Stems leafy. Flowers corymbed or umbelled. Petals widely spreading. Style very short and top-shaped. Valves of the capsule smooth on the edges.
22. **Moneses.** Scape 1-flowered. Petals widely spreading. Style straight, exserted; stigma 5-rayed. Valves of the capsule smooth on the edges.

23. **Pyrola.** Acaulescent. Flowers in a raceme. Petals not widely spreading. Filaments awl-shaped. Style long. Valves of the capsule cobwebby on the edges.

SUBORDER IV. **Monotropeæ.** (INDIAN-PIPE FAMILY.) Flowers nearly as in Suborders 2 or 3, but the plants herbaceous, root-parasitic, entirely destitute of green foliage, and with the aspect of Beech-drops. Seeds as in Suborder 3.

* Corolla monopetalous ; anthers 2-celled.

24. **Pterospora.** Corolla ovate, 5-toothed; anthers 2-awned on the back, opening lengthwise.
25. **Schweinitzia.** Corolla broadly bell-shaped, 5-lobed ; anthers opening at the top.

* * Corolla of 4 or 5 separate petals; calyx imperfect or bract-like.

26. **Monotropa.** Petals narrow. Anthers kidney-shaped, opening across the top.

## 1. GAYLUSSÁCIA, HBK. HUCKLEBERRY.

Corolla tubular, ovoid, or bell-shaped ; the border 5-cleft. Stamens 10 ; anthers awnless ; the cells tapering upward into more or less of a tube, opening by a chink at the end. Fruit a berry-like drupe, containing 10 seed-like nutlets. — Branching shrubs, with the aspect of Vaccinium, commonly sprinkled with resinous dots ; the flowers (white tinged with purple or red) in lateral and bracted racemes. (Named for the distinguished chemist, *Gay-Lussac.*)

* *Leaves thick and evergreen, somewhat serrate, not resinous-dotted.*

1. **G. brachýcera,** Gray. (BOX-HUCKLEBERRY.) Very smooth (1° high) ; leaves oval, finely crenate-toothed ; racemes short and nearly sessile ; pedicels very short ; corolla cylindrical-bell-shaped — Wooded hills, Perry Co., Penn., to Del. and Va. May. — Leaves resembling those of the Box.

* * *Leaves deciduous, entire, sprinkled more or less with resinous or waxy atoms.*

2. **G. dumòsa,** Torr. & Gray. (DWARF HUCKLEBERRY.) *Somewhat hairy* and glandular, low (1 – 5° high from a creeping base), bushy ; *leaves* obovate-oblong, *mucronate, green both sides,* rather thick and shining when old ; racemes elongated ; *bracts leaf-like, oval, persistent, as long as the pedicels ; ovary bristly or glandular ;* corolla bell-shaped ; fruit black (insipid) — Var. HIRTÉLLA has the young branchlets, racemes, and often the leaves hairy. — Sandy swamps, Newf., along the coast to Fla. and La. ; the var. chiefly southward. June.

3. **G. frondòsa,** Torr. & Gray (BLUE TANGLE. DANGLEBERRY.) *Smooth* (3 – 6° high) ; branches slender and divergent ; *leaves* obovate-oblong, blunt, *pale, glaucous beneath* ; racemes slender, loose , *bracts oblong or linear, deciduous, shorter than the slender drooping pedicels* ; corolla globular-bell-shaped ; fruit dark blue with a white bloom (sweet and edible) — Low copses, coast of N. Eng. and mountains of Penn. to Ky., south to La. and Fla. May, June

4. **G. resinòsa,** Torr & Gray. (BLACK HUCKLEBERRY.) Much branched, rigid, *slightly pubescent* when young (1 – 3° high) , *leaves* oval, oblong-ovate, or oblong, thickly clothed and at first *clammy, as well as the flowers, with shining resinous globules ;* racemes short, clustered, one-sided ; pedicels about the length of the flowers ; *bracts and bractlets (reddish) small and deciduous ;* corolla ovoid-conical, or at length cylindrical with an open mouth ; fruit black, without bloom (pleasant, very rarely white). — Rocky woodlands and swamps, Newf. to Minn., south to N. Ga. May, June. — The common *Huckleberry* of the markets.

## 2. VACCÍNIUM, L. BLUEBERRY. BILBERRY. CRANBERRY.

Corolla various in shape; the limb 4–5-cleft, revolute. Stamens 8 or 10; anthers sometimes 2-awned on the back; the cells separate and prolonged upward into a tube, opening by a hole at the apex. Berry 4–5-celled, many-seeded, or sometimes 8–10-celled by a false partition stretching from the back of each cell to the placenta. — Shrubs with solitary, clustered, or racemed flowers; the corolla white or reddish. (Ancient Latin name of obscure derivation.)

§ 1. BATODÉNDRON. *Corolla open-campanulate, 5-lobed; anthers with long tubes, and 2-awned on the back; berry (hardly edible) spuriously 10-celled; leaves deciduous but firm; flowers solitary or in leafy-bracted racemes, slender-pedicelled.*

1. **V. arbòreum,** Marshall. (FARKLE-BERRY.) *Tall* (6–25° high), smoothish; leaves obovate to oblong, entire or denticulate, mucronate, bright green, shining above, at the south evergreen; *corolla white; anthers included;* berries black, globose, small, many-seeded. — Sandy soil, S. Ill. to Tex., Fla., and N. C.

2. **V. stamíneum,** L. (DEERBERRY. SQUAW HUCKLEBERRY.) Diffusely branched (2–3° high), somewhat pubescent; leaves ovate or oval, pale, glaucous or whitish underneath; *corolla greenish-white or purplish; anthers much exserted;* berries greenish or yellowish, globular or pear-shaped, large, few-seeded. — Dry woods, Maine to Minn., south to Fla. and La.

§ 2. CYANOCÓCCUS. (BLUEBERRIES.) *Corolla cylindraceous to campanulate, 5-toothed; filaments hairy; anthers included, awnless; berry (sweet and edible) blue or black with bloom, completely or incompletely 10-celled; flowers in fascicles or short racemes, short-pedicelled, appearing from large scaly buds with or before the leaves.*

* *Corolla cylindraceous when developed.*

3. **V. virgàtum,** Ait. Low, more or less pubescent; leaves ovate-oblong to cuneate-lanceolate, usually acute and minutely serrulate, thinnish, shining at least above; flower-clusters sometimes virgate on naked branches; corolla rose-color; berry black. — In swamps, south of our range, but represented by

Var. **tenéllum,** Gray. Low form, mostly small-leaved, with smaller nearly white flowers in shorter or closer clusters. — Va. to Ark., and southward.

* * *Corolla shorter and broader.* (BLUEBERRIES or BLUE HUCKLEBERRIES.)

4. **V. Pennsylvánicum,** Lam. (DWARF BLUEBERRY.) Dwarf (6–15′ high), smooth, with green warty stems and branches; *leaves lanceolate or oblong, distinctly serrulate with bristle-pointed teeth, smooth and shining both sides* (or sometimes downy on the midrib underneath); corolla short, cylindrical-bell-shaped; berries bluish-black and glaucous. — Dry hills, N. J. to Ill., north to Newf. and Sask. The lowest and earliest ripened of the blueberries. — Var. ANGUSTIFÒLIUM, Gray; a dwarfer high-mountain or northern form, with narrower lanceolate leaves. — White Mts. of N. H., Newf., and far northward.

5. **V. Canadénse,** Kalm. Low (1–2° high); *leaves oblong-lanceolate or elliptical, entire, downy both sides,* as well as the crowded branchlets; corolla shorter; otherwise as the last. — Swamps or moist woods, N. New Eng. to mountains of Penn., Ill., Minn., and northward.

6. **V. vacíllans,** Solander. (LOW BLUEBERRY.) *Low* (1 – 2½° high), *glabrous*, with yellowish-green branchlets; *leaves obovate or oval, very pale or dull, glaucous*, at least underneath, minutely ciliolate serrulate or entire; corolla between bell-shaped and cylindraceous, the mouth somewhat contracted. — Dry places, especially in sandy soil, New Eng. to Mich. and Iowa, south to N. C. and Mo. — Berries ripening later than those of n. 4.

7. **V. corymbòsum,** L. (COMMON or SWAMP-BLUEBERRY.) *Tall* (5 – 10° high); *leaves ovate, oval, oblong, or elliptical-lanceolate*; corolla varying from turgid-ovate and cylindrical-urn-shaped to oblong-cylindrical, 3 – 4″ long. — Swamps and low thickets, throughout our range and southward. This yields the common *blueberry* or *blue huckleberry* of the latter part of the season. The typical form has leaves with naked entire margins, and may be pubescent or glabrous (var. GLÀBRUM, *Gray*, Man.) Numerous gradations unite the following varieties: —

Var. **amœnum,** Gray. Leaves bristly-ciliate, shining above, green both sides, beneath somewhat pubescent on the veins. — Middle Atlantic States.

Var. **pállidum,** Gray. Leaves mostly glabrous, pale or whitish, glaucous especially underneath, serrulate with bristly teeth. — Common in the Alleghanies southward, mostly on the higher ridges.

Var. **atrocóccum,** Gray. The most distinct form; leaves entire, downy or woolly underneath even when old, as also the branchlets; berries smaller, black, without bloom. — New Eng. to Penn.

§ 3. VACCINIUM proper. (BILBERRIES.) *Corolla ovate to globular*, 4 – 5-*toothed; filaments glabrous; anthers* 2-*awned on the back, included; berry* 4 – 5-*celled; leaves deciduous; flowers on drooping pedicels, solitary or few together, appearing with or after the leaves; mostly glabrous.*

* *Parts of the flower mostly in fours; stamens* 8.

8. **V. uliginòsum,** L. (BOG BILBERRY.) Low and spreading (4′ – 2° high), tufted; leaves entire, dull, obovate or oblong, pale and slightly pubescent underneath; flowers single or 2 – 3 together from a scaly bud, almost sessile; corolla short, urn-shaped; berries black with a bloom, sweet. — Alpine tops of the high mountains of N. Eng. and N. Y., shore of L. Superior, and northwestward. (Eu.)

* * *Parts of the flower in fives; stamens* 10; *leaves membranaceous; flowers solitary on short axillary peduncles, nodding.*

9. **V. cæspitòsum,** Michx. Dwarf (3 – 6′ high), tufted, *leaves obovate*, narrowed at the base, smooth and *shining, serrate; corolla oblong*, slightly urn-shaped; berries blue. — Alpine region of the White Mts., and high northward. — Var. CUNEIFÒLIUM, Nutt., is a foot high or less, bushy, with cuneate-spatulate leaves rounded at the apex, passing in one form to spatulate-lanceolate and acute. — Shores of L. Superior and westward.

10. **V. myrtilloìdes,** Hook. More erect, 1 – 5° high; branchlets somewhat angled; *leaves mostly ovate and acute or pointed*, sharply and closely *serrulate, bright green*, nearly smooth; border of the calyx almost entire; *corolla depressed-globular*, rather large; berries large, black, rather acid. — Damp woods, shores of L. Superior, and northwestward. May, June. — Pedicels 3 – 6″ long, drooping in flower, erect in fruit.

11. **V. ovalifòlium,** Smith. Straggling, 2–12° high; *leaves elliptical, obtuse, nearly entire, pale,* mostly glaucous beneath, smooth; *corolla ovoid;* berries blue. — Peat-bogs, shores of L. Superior, and northwestward. May.

§ 4. VÌTIS-IDÆA. *Corolla, berry, etc., as in* § 3; *filaments hairy; anthers awnless; leaves coriaceous and persistent; flowers in clusters from separate buds, 4-merous (in our species); mostly glabrous; leaves 3–6″ long.*

12. **V. Vìtis-Idæa,** L. (COWBERRY. MOUNTAIN CRANBERRY. FOXBERRY.) Low (6–10′ high); branches erect from tufted creeping stems; leaves obovate with revolute margins, dark green, smooth and shining above, dotted with blackish bristly points underneath; corolla bell-shaped, 4-cleft; berries dark red, acid and rather bitter, edible when cooked. Coast and mountains of N. Eng. to N. shore of L. Superior, and far northward. June. (Eu.)

§ 5. OXYCÓCCUS. *Corolla deeply 4-parted or -cleft, with linear reflexed lobes; anthers exserted, awnless, with very long terminal tubes; berry 4-celled; flowers axillary or terminal, nodding on long filiform pedicels.*

* *Stem upright and leaves deciduous, as in common Blueberries; flowers axillary and solitary; corolla deeply 4-cleft; berries light red, turning purple, insipid.*

13. **V. erythrocárpon,** Michx. Smooth, divergently branched (1–4° high); leaves oblong-lanceolate, taper-pointed, bristly serrate, thin. — Damp woods, higher Alleghanies, Va. to Ga. July.

* * *Stems very slender, creeping or trailing; leaves small, entire, whitened beneath, evergreen; pedicels erect, the pale rose-colored flower nodding; corolla 4-parted; berries red, acid.* — CRANBERRIES.

14. **V. Oxycóccus,** L. (SMALL CRANBERRY.) Stems very slender (4–9′ long); *leaves ovate, acute, with strongly revolute margins* (2–3″ long); pedicels 1–4, terminal; filaments fully ½ as long as the anthers. — Peat-bogs, N Eng. and Penn. to Minn., and northward. June. — Berry 3–4″ broad, often speckled with white when young; seldom gathered for market. (Eu., Asia.)

15. **V. macrocárpon,** Ait. (LARGE OR AMERICAN CRANBERRY.) Stems elongated (1–4° long), the flowering branches ascending; *leaves oblong, obtuse,* less revolute (4–6″ long); pedicels several, becoming lateral, filaments scarcely one third the length of the anthers. — Peat-bogs, N C. to Minn., and everywhere northward, but scarcely westward. June. — Berry ½–1′ long.

## 3. CHIÓGENES, Salisb. CREEPING SNOWBERRY.

Calyx-tube adherent to the ovary; limb 4-parted, persistent. Corolla bell-shaped, deeply 4-cleft. Stamens 8, included, inserted on an 8-toothed disk, filaments very short and broad; anther-cells ovate-oblong, separate, not awned on the back, but each minutely 2-pointed at the apex, and opening by a large chink down to the middle. Berry white, globular, rather dry, 4-celled, many-seeded. — A trailing and creeping evergreen, with very slender and scarcely woody stems, and small Thyme-like, ovate and pointed leaves on short petioles, with revolute margins, smooth above, the lower surface and the branches beset with rigid rusty bristles. Flowers very small, solitary in the axils, on short nodding peduncles, with 2 large bractlets under the calyx. (Name from χιών, *snow,* and γένος, *offspring,* in allusion to the snow-white berries.)

1. **C. serpyllifòlia,** Salisb. Leaves 3–4″ long; berries 3″ broad, bright white. (C. hispidula, *Torr. & Gray.*) — Peat-bogs, and mossy woods, N. J. and Penn. to Minn., and northward; also southward in the Alleghanies to N. C. May. — Plant with the aromatic flavor of Gaultheria or Sweet Birch.

### 4. ARCTOSTÁPHYLOS, Adans. BEARBERRY.

Corolla ovate and urn-shaped, with a short revolute 5-toothed limb. Stamens 10, included; anthers with 2 reflexed awns on the back near the apex, opening by terminal pores. Drupe berry-like, with 5–10 seed-like nutlets. — Shrubs, with alternate leaves, and scaly-bracted nearly white flowers in terminal racemes or clusters. Fruit austere. (Name composed of ἄρκτος, *a bear,* and σταφυλή, *a grape* or *berry*, the Greek of the popular name.)

1. **A. Ùva-úrsi,** Spreng. (BEARBERRY.) Trailing; *leaves thick and evergreen,* obovate or spatulate, *entire, smooth; fruit red.* — Rocks and bare hills, N. J. and Penn. to Mo., and far north and westward. May. (Eu., Asia.)

2. **A. alpìna,** Spreng. (ALPINE BEARBERRY.) Dwarf, tufted and depressed; *leaves deciduous, serrate, wrinkled* with strong netted veins, obovate; *fruit black.* — Alpine summits in N. Eng., and high northward. (Arctic-alpine around the world.)

### 5. EPIGÆA, L. GROUND LAUREL. TRAILING ÁRBUTUS.

Corolla salver-form; the tube hairy inside, as long as the ovate-lanceolate pointed and scale-like nearly distinct sepals. Stamens 10, with slender filaments; anthers oblong, awnless, opening lengthwise. Style slender, its apex (as in Pyrola) forming a sort of ring or collar around and partly adnate to the 5 little lobes of the stigma. Capsule depressed-globular, 5-lobed, 5-celled, many-seeded. — A prostrate or trailing scarcely shrubby plant, bristly with rusty hairs, with evergreen and reticulated rounded and heart-shaped alternate leaves, on slender petioles, and with rose-colored flowers in small axillary clusters, from scaly bracts. (Name composed of ἐπί, *upon,* and γῆ, *the earth,* from the trailing growth.)

1. **E. rèpens,** L. — Sandy woods, or in rocky soil, especially in the shade of pines, Newf. to Minn., south to Fla., and Ky. — Flowers appearing in early spring, exhaling a rich spicy fragrance, dimorphous as to style and stamens and subdiœcious. In New England called MAYFLOWER.

### 6. GAULTHÈRIA, Kalm. AROMATIC WINTERGREEN.

Corolla cylindrical-ovoid or a little urn-shaped, 5-toothed. Stamens 10, included; anther-cells each 2-awned at the summit, opening by a terminal pore. Capsule depressed, 5-lobed, 5-celled, 5-valved, many-seeded, enclosed when ripe by the calyx, which thickens and turns fleshy, so as to appear as a globular red berry! — Shrubs, or almost herbaceous plants, with alternate evergreen leaves and axillary (nearly white) flowers; pedicels with 2 bractlets. (Dedicated by Kalm to "*Dr. Gaulthier,*" of Quebec.)

1. **G. procúmbens,** L. (CREEPING WINTERGREEN.) Stems slender and extensively creeping on or below the surface; the flowering branches ascending, leafy at the summit (3–5′ high); leaves obovate or oval, obscurely serrate; flowers few, mostly single in the axils, nodding. — Cool damp woods,

mostly in the shade of evergreens, Maine to Minn., and southward to N. Ga.; also far northward. July. — The bright red berries (formed of the calyx) and the foliage have the well-known spicy-aromatic flavor of the Sweet Birch. Usually called *Wintergreen*, or sometimes in the interior *Tea-berry*. Eastward it is often called *Checkerberry* or *Partridge-berry* (names also applied to Mitchella, the latter especially so), also *Boxberry*.

## 7. ANDRÓMEDA, L.

Calyx without bractlets, of 5 nearly or partly distinct sepals, valvate in the bud, but very soon separate or open. Corolla urceolate (in ours), 5-toothed. Stamens 10; anthers fixed near the middle, the cells opening by a terminal pore. Capsule globular, 5-celled, 5-valved; the many-seeded placentæ borne on the summit or middle of the columella. Seeds pendulous or spreading. — Shrubs, with umbelled, clustered, or panicled and racemed (mostly white) flowers. (Fancifully named by Linnæus in allusion to the fable of *Andromeda*.)

* *Anthers awned; capsule more or less globose; leaves thick and evergreen.*

1. **A. polifòlia,** L. *Glabrous,* 6–18′ high; leaves linear to lanceolate-oblong, strongly revolute, *white beneath;* flowers in terminal umbels; pedicels from axils of persistent scaly bracts; *each anther-cell with a slender terminal ascending awn.* — Wet bogs, N. J. and Penn. to Minn., and northward.

2. **A. floribúnda,** Pursh. Very leafy, 2–6° high; *young branchlets, etc., strigose-hairy;* leaves lanceolate-oblong, acute or acuminate, ciliate-serrulate, *glandular-dotted beneath* (2′ long); *racemes crowded in short terminal panicles,* densely flowered; *each anther-cell with a slender deflexed awn on the back.*—Moist hillsides, in the Alleghanies from Va. to Ga.

* * *Anthers awnless; capsule 5-angled, with a thickened ridge at the dorsal sutures; leaves thinnish and deciduous.*

3. **A. Mariàna,** L. (Stagger-bush.) *Mostly glabrous,* 2–4° high; leaves oblong or oval (1–3′ long); *fascicles of nodding flowers racemose on naked shoots; filaments 2-toothed near the apex; capsule ovate-pyramidal, truncate at the contracted apex.* — Low grounds, R.I. to Fla.; also in Tenn. and Ark. Foliage said to poison lambs and calves.

4. **A. ligustrìna,** Muhl. *Minutely pubescent,* 3–10° high; leaves obovate to lanceolate-oblong (1–2′ long), serrulate or entire; *racemes crowded in naked or leafy panicles; filaments flat, not appendaged; capsule globular.* — Wet grounds, Canada to Fla. and Ark. — Var. pubéscens, Gray, is a form with dense soft pubescence. — Va. to Ga.

## 8. OXYDÉNDRUM, DC. Sorrel-tree. Sour-wood.

Calyx without bractlets, of 5 almost distinct sepals, valvate in the bud. Corolla ovate, 5-toothed, puberulent. Stamens 10; anthers fixed near the base, linear, awnless, the cells tapering upward and opening by a long chink. Capsule oblong-pyramidal, 5-celled, 5-valved; the many-seeded placentæ at the base of the cells. Seeds *all ascending,* slender, the thin and loose reticulated coat extended at both ends into awl-shaped appendages. — A tree with deciduous, oblong-lanceolate, pointed, soon smooth, serrulate leaves, on slender petioles, and white flowers in long one-sided racemes clustered in an open panicle, terminating the branches of the season. Bracts and bractlets minute, deciduous. Foliage acid (whence the name, from ὀξύς, *sour*, and δένδρον, *tree*.)

1. **O. arbòreum,** DC. Tree 15–40° high; leaves in size and shape like those of the peach. — Rich woods, from Penn. to Ind., and southward, mostly along the Alleghanies, to Fla. June, July.

## 9. LEUCÓTHOË, Don.

Calyx of 5 nearly distinct sepals, imbricated in the bud. Corolla ovate or cylindraceous, 5-toothed. Stamens 10; anthers naked, or the cells with 1 or 2 erect awns at the apex, opening by a pore. Capsule depressed, more or less 5-lobed, 5-celled, 5-valved, the sutures not thickened; valves entire; the many-seeded placentæ borne on the summit of the short columella. Seeds mostly pendulous. — Shrubs with petioled and serrulate leaves, and white scaly-bracted flowers in dense axillary or terminal spiked racemes. (A mythological name.)

∗ *Anthers awnless; stigma 5-rayed; racemes sessile, dense, with persistent bracts, in the axils of thick and shining evergreen leaves; calyx not bracteolate.*

1. **L. axillàris,** Don. *Leaves lanceolate-oblong or oval, abruptly pointed* or acute, somewhat spinulose-serrulate, *on very short petioles; sepals broadly ovate.* — Low grounds, Va. to Fla. and Ala. Feb.–April. — Shrub 2–4° high.

2. **L. Catesbæi,** Gray. *Leaves ovate-lanceolate, taper-pointed,* serrulate with ciliate-spinulose appressed teeth, *conspicuously petioled* (3–6′ long); *sepals ovate-oblong,* often acute. — Moist banks of streams, Va. to Ga. along the mountains. May. — Shrub 2–4° high, with long spreading or recurved branches. Flowers exhaling the unpleasant scent of Chestnut-blossoms.

∗ ∗ *Anthers awned; stigma simple; flowers very short-pedicelled, in long one-sided racemes mostly terminating the branches; bracts deciduous; leaves membranaceous and deciduous, serrulate; calyx bibracteolate.*

3. **L. recúrva,** Buckley. *Branches and racemes recurved-spreading;* leaves lanceolate or ovate, taper-pointed; *sepals ovate; anther-cells 1-awned; pod 5-lobed; seeds flat and cellular-winged.* — Dry hills, Alleghanies of Va. to Ala. April. — Lower and more straggling than the next.

4. **L. racemòsa,** Gray. *Branches and racemes mostly erect;* leaves oblong or oval-lanceolate, acute; *sepals ovate-lanceolate; anther-cells each 2-awned; pod not lobed; seeds angled and wingless.* — Moist thickets, Mass. to Fla. and La., near the coast. May, June. — Shrub 4–10° high. Corolla cylindrical.

## 10. CASSÁNDRA, Don. LEATHER-LEAF.

Calyx of 5 distinct rigid ovate and acute sepals, imbricated in the bud, and with a pair of similar bractlets. Corolla cylindrical-oblong, 5-toothed. Stamens 10; anther-cells tapering into a tubular beak, and opening by a pore at the apex, awnless. Capsule depressed, 5-celled, many-seeded, the pericarp of 2 layers, the outer 5-valved, the cartilaginous inner layer at length 10-valved. Seeds flattened, wingless. — Low and much branched shrubs, with nearly evergreen and coriaceous leaves, which are scurfy, especially underneath. Flowers white, in the axils of the upper small leaves, forming small 1-sided leafy racemes. (*Cassandra,* a daughter of Priam and Hecuba.)

1. **C. calyculàta,** Don. Leaves oblong, obtuse, flat. — Bogs, Newf. to Minn., and south to Ga.

### 11. CASSÌOPE, Don.

Calyx without bractlets, of 4 or 5 nearly distinct ovate sepals, imbricated in the bud. Corolla broadly campanulate, deeply 4 – 5-cleft. Stamens 8 or 10; anthers fixed by the apex; the ovoid cells each opening by a large terminal pore, and bearing a long recurved awn behind. Capsule ovoid or globular, 4 – 5-celled, 4 – 5-valved, the valves 2-cleft; placentæ many-seeded, pendulous from the summit of the columella. Seeds smooth and wingless. — Small, arctic or alpine evergreen plants, resembling Club-Mosses or Heaths. Flowers solitary, nodding on slender erect peduncles, white or rose-color. (*Cassiope* was the mother of Andromeda.)

1. **C. hypnoìdes,** Don. Tufted and procumbent, moss-like (1 – 4′ high); leaves needle-shaped, imbricated; corolla 5-cleft; style short and conical. — Alpine summits of N. New Eng. and N. Y., and high northward.

### 12. CALLÙNA, Salisb. HEATHER. LING.

Calyx of 4 colored sepals. Corolla bell-shaped, 4-parted, much shorter and less conspicuous than the calyx, both becoming scarious and persistent. Stamens 8, distinct; anthers with a pair of deflexed appendages on the back, the cells opening each by a long chink. Capsule 4-celled, septicidally 4-valved. — Evergreen undershrub, with no scaly buds, opposite and minute leaves (mostly extended at base into 2 sharp auricles), crowded and imbricated on the branches. Flowers axillary, or terminating very short shoots and crowded on the branches, forming close mostly one-sided spikes or spike-like racemes, rose-colored or sometimes white, small, bracted by 2 or 3 pairs of leaves, the innermost of which are more or less scarious. (Named from *καλλύνω, to brush* or *sweep*, brooms being made of its twigs.)

1. **C. vulgàris,** Salisb. Low grounds, Mass., at Tewksbury and W. Andover; Maine, at Cape Elizabeth; also N. Scotia, C. Breton, Newf., etc. Probably only introduced.

Two European heaths, Erìca cinèrea and E. Tétralix, have been found in small patches on Nantucket Island.

### 13. BRYÁNTHUS, Steller.

Corolla urn-shaped or bell-shaped, 5-toothed or 5-cleft, deciduous. Stamens 10; anthers pointless, shorter than the filaments, opening by terminal pores. Capsule 5-celled, 5-valved, septicidal (as are all the succeeding), many-seeded. — Low alpine Heath-like evergreen undershrubs, clothed with scattered linear and obtuse smooth or rough-margined leaves. Flowers usually nodding on solitary or umbelled peduncles at the summit of the branches. Our species belongs to § Phyllódoce. (*Βρύον, moss,* and *ἄνθος, flower,* because growing among mosses.)

1. **B. taxifòlius,** Gray. Calyx pubescent; corolla oblong-urn-shaped, 5-toothed, purplish, smooth; style included. (Phyllodoce taxifolia, *Salisb.*) — Alpine summits of the mountains of N. H. and Maine, and northward. July.

### 14. KÁLMIA, L. AMERICAN LAUREL.

Calyx 5-parted. Corolla between wheel-shaped and bell-shaped, 5-lobed, furnished with 10 depressions in which the 10 anthers are severally lodged; filaments long and thread-form. Capsule globose, 5-celled, many-seeded. — Evergreen mostly smooth shrubs, with alternate or opposite entire coriaceous leaves, naked buds, and showy flowers. (Dedicated to *Peter Kalm*, a pupil of Linnæus, who travelled in this country about the middle of the last century, afterwards Professor at Abo.)

§ 1. *Flowers in simple or clustered naked umbel-like corymbs; pedicels from the axils of small and firm foliaceous persistent bracts; calyx smaller than the pod, persistent; leaves and branches glabrous, or nearly so.*

1. **K. latifòlia,** L. (CALICO-BUSH. MOUNTAIN LAUREL. SPOON-WOOD.) *Leaves mostly alternate, bright green both sides, ovate-lanceolate* or oblong, acute at each end, petioled; flowers profuse, large and very showy, varying from deep rose-color to nearly white; *corymbs terminal*, many-flowered, clammy-pubescent; pod depressed, glandular. — Rocky hills and damp soil, Canada and Maine, chiefly along the mountains to W. Fla., west to Ohio, Ky., and Tenn. Usually a shrub 4 – 8° high, but in the mountains from Penn. southward forming dense thickets and often tree-like (10 – 30° high). May, June.

2. **K. angustifòlia,** L. (SHEEP LAUREL. LAMBKILL. WICKY.) Shrub 1 – 3° high; *leaves commonly opposite or in threes, pale or whitish underneath, light green above, narrowly oblong*, obtuse, petioled; *corymbs lateral* (appearing later than the shoots of the season), slightly glandular, many-flowered; pod depressed, nearly smooth; *pedicels recurved in fruit.* — Hillsides, Newf. to Mich., south to N. Ga.; common. May, June. The flowers more crimson and two thirds smaller than in the last.

3. **K. glaùca,** Ait. (PALE LAUREL.) *Branchlets 2-edged; leaves opposite, nearly sessile, oblong, white-glaucous beneath, with revolute margins;* corymbs terminal, few-flowered, smooth; bracts large; flowers ½′ broad, lilac-purple; pod ovoid, smooth. — Cold peat-bogs and mountains, Newf. to Penn., Minn., and northward. May, June. — Straggling, about 1° high.

§ 2. *Flowers scattered, solitary in the axils; calyx leafy, larger than the pod, nearly equalling the corolla, deciduous; leaves and branches bristly-hairy.*

4. **K. hirsùta,** Walt. Branches terete; leaves oblong or lanceolate (4″ long), becoming glabrous. — Sandy pine-barren swamps, S. E. Va. to Fla. May – Sept. — Shrub 1° high; corolla rose-color.

### 15. MENZIÈSIA, Smith.

Calyx very small and flattish, 4-toothed or 4-lobed. Corolla cylindraceous-urn-shaped and soon bell-shaped, obtusely 4-lobed. Stamens 8, included; anther-cells opening at the top by an oblique pore. Capsule ovoid, woody, 4-celled, 4-valved, many-seeded. Seeds narrow, with a loose coat. — A low shrub; the straggling branches and the alternate deciduous leaves usually hairy and ciliate with rusty rather chaff-like bristles. Flowers small, developed with the leaves, in terminal clusters from scaly buds, greenish-white and purplish, nodding. (Named for *Archibald Menzies*, who in Vancouver's voyage brought the original species from the Northwest Coast.)

1. **M. glabélla,** Gray. Strigose-chaffy scales mostly wanting; leaves obovate, barely mucronate-tipped, *glabrous* or nearly so (1 – 2′ long); *filaments ciliate below; capsule glabrous* or nearly so; *seeds long-caudate at each end.* — Minnesota Point, L. Superior, and northwestward.

2. **M. globulàris,** Salisb. More or less chaffy, 2 – 5° high; leaves obovate-oblong, prominently glandular-mucronate, *strigose-hirsute* especially above; *filaments glabrous; capsule beset with short gland-tipped bristles; seeds merely apiculate.* (M. ferruginea, var. globularis, of Manual.) — In the Alleghanies from Penn. to Ga.

## 16. RHODODÉNDRON, L. Rose Bay, Azalea, etc.

Flowers almost always 5-merous. Calyx mostly small or minute. Corolla various (but not contracted at the orifice), lobed or cleft, or even parted, often somewhat irregular. Stamens sometimes as few as the corolla-lobes, more commonly twice as many, usually declined; anther-cells opening by a round terminal pore. Capsule 5-celled, 5-valved, many-seeded. Seeds scale-like. — Shrubs or small trees, of diverse habit and character, with chiefly alternate entire leaves, and large and showy flowers in umbelled clusters from large scaly-bracted terminal buds. (*Ῥοδόδενδρον, rose-tree;* the ancient name.)

§ 1. AZÀLEA. *Leaves deciduous, glandular-mucronate; stamens* (5 *to* 10) *and style more or less exserted and declined.*

* *Flower-buds of numerous much imbricated scales; corolla with conspicuous funnel-form tube; stamens* (*chiefly* 5) *and style long-exserted;* 3 – 10° *high, with leaves obovate to oblong-oblanceolate.*

+ *Flowers appearing after the leaves.*

1. **R. arboréscens,** Torr. (Smooth Azalea.) *Branchlets smooth; leaves* obovate, obtuse, *very smooth both sides, shining above,* glaucous beneath, the margins bristly-ciliate; *calyx-lobes long and conspicuous*, corolla slightly clammy. (Azalea arborescens, *Pursh.*) — Mountains of Penn. to N. C. June. Rose-colored flowers very fragrant.

2. **R. viscòsum,** Torr. (Clammy A. White Swamp-Honeysuckle.) *Branchlets bristly,* as well as the margins and midrib of the oblong-obovate otherwise smooth leaves; *calyx-lobes minute; corolla clammy, the tube much longer than the lobes.* (Azalea viscosa, *L.*) — Swamps, mostly near the coast, Canada and Maine, to Fla. and Ark. June, July. — Var. glaùcum, Gray. Leaves paler, often white-glaucous underneath or on both sides, sometimes rough-hairy. N. Eng. to Va. — Var. nítidum, Gray. Dwarf, with oblanceolate leaves green both sides. Mountains, N. Y. to Va.

+ + *Flowers appearing before or with the leaves.*

3. **R. nudiflòrum,** Torr. (Purple A. Pinxter-flower.) Leaves downy underneath; *tube of the corolla scarcely longer than the ample lobes, slightly glandular.* (Azalea nudiflora, *L.*) — Swamps, Canada to Fla., Ill., Mo., and Tex. April, May. The showy flowers vary from flesh-color to pink and purple. There are numberless varieties, some of them with 10 stamens.

4. **R. calendulàceum,** Torr. (Flame-colored Azalea.) Leaves hairy; *tube of the corolla shorter than the lobes, hairy.* (Azalea calendulacea,

*Michx.*) — Woods, mountains of Penn. to Ga. May. Covered just when the leaves appear with a profusion of large orange blossoms, usually turning to flame-color, not fragrant.

* * *Flower-buds of fewer and early caducous scales; corolla irregular, with short or hardly any tube, anteriorly divided to the base; the limb equalling the* 10 *stamens and style.*

5. **R. Rhodòra,** Don. Young parts sparingly strigose-hairy (1 – 2° high); leaves oblong, pale, more or less pubescent; corolla hardly 1′ long, purplish-rose-color, bilabiate, with the posterior lip 3-lobed, the anterior of 2 oblong-linear and recurving nearly or quite distinct petals. (Rhodora Canadensis, *L.*) — Cool bogs, Newf. and N. Eng. to mountains of Penn.

§ 2. RHODODÉNDRON proper. *Leaves coriaceous and persistent; stamens* (*commonly* 10) *and style rarely exserted, somewhat declined, or sometimes equally spreading.*

6. **R. máximum,** L. (GREAT LAUREL.) *Leaves* 4 – 10′ long, very thick, *elliptical-oblong* or lance-oblong, *acute, narrowed toward the base, very smooth,* with somewhat revolute margins; pedicels viscid; corolla bell-shaped, 1′ broad, pale rose-color or nearly white, greenish in the throat on the upper side, and spotted with yellow or reddish. — Damp deep woods, rare from Maine to Ohio, but very common through the Alleghanies from N. Y. to Ga. July. — Shrub or tree 6 – 35° high.

7. **R. Catawbiénse,** Michx. *Leaves oval or oblong, rounded at both ends, smooth,* pale beneath (3 – 5′ long); corolla broadly bell-shaped, lilac-purple; pedicels rusty-downy. — High Alleghanies, Va. to Ga. June. Shrub 3 – 6° (rarely 20°) high.

8. **R. Lappónicum,** Wahl. *Dwarf,* prostrate in broad tufts (6′ high); *leaves* (½′ long) *elliptical, obtuse, dotted* (like the branches) with rusty scales; umbels few-flowered; corolla open bell-shaped, dotted, violet-purple; *stamens* 5 – 10. — Alpine summits of northern N. Y. and N. Eng., to the Arctic Coast. July. (Arct. Eu. and Asia.)

## 17. LÈDUM, L. LABRADOR TEA.

Calyx 5-toothed, very small. Corolla of 5 obovate and spreading distinct petals. Stamens 5 – 10; anthers opening by terminal pores. Capsule 5-celled, splitting from the base upward, many-seeded; placentæ borne on the summit of the columella. — Low shrubs, with the alternate entire leaves clothed with rusty wool underneath, persistent, the margins revolute; herbage slightly fragrant when bruised. Flowers white, small, in terminal umbel-like clusters from large scaly buds; bracts or scales thin and caducous. (Λῆδον, the ancient Greek name of the Cistus.)

1. **L. latifòlium,** Ait. Erect, 1 – 3° high; leaves oblong or linear-oblong (1 – 2′ long), mostly ½′ wide, very obtuse; stamens 5 – 7; capsule oblong, acutish. — N. Eng. to Penn., Mich., Minn., and northward, in cold bogs and mountain woods.

**L.** PALÚSTRE, L., with linear leaves, 10 stamens, and short-oval capsule, is found in Newfoundland and northwestward. (Eu.)

### 18. LEIOPHÝLLUM, Pers. SAND MYRTLE.

Calyx 5-parted. Corolla of 5 distinct obovate-oblong petals, spreading. Stamens 10, exserted; anthers opening lengthwise. Style filiform. Capsule 2–3-celled, splitting from the apex downward, many-seeded. — A low much-branched evergreen, with the aspect, foliage, etc., of the last genus, but the crowded leaves sometimes opposite, scarcely petioled. Flowers small, white, in terminal umbel-like clusters. (Name formed of λεῖος, *smooth*, and φύλλον, *leaf*.)

1. **L. buxifòlium,** Ell. Shrub 6–10′ high; leaves oval or oblong, smooth and shining, 3–6″ long. — Sandy pine barrens, N. J. to Fla. May.

### 19. LOISELEÙRIA, Desv. ALPINE AZALEA.

Calyx 5-parted, nearly as long as the bell-shaped and deeply 5-cleft regular corolla. Stamens 5, not declined, included; anthers opening lengthwise. Style short. Capsule ovoid, 2–3-celled, many-seeded, 2–3-valved; valves 2-cleft from the apex; placentæ borne on the middle of the columella. — A small depressed shrubby evergreen, much branched and tufted, smooth, with coriaceous opposite elliptical leaves, on short petioles, with revolute margins. Flowers small, white or rose-color, 2–5 in a cluster, from a terminal scaly bud; scales or bracts thick and persistent. (Named for *Loiseleur-Delongchamps*, a French botanist.)

1. **L. procúmbens,** Desv. — Alpine summits of the White Mountains, N. H., and northward. June. (Eu., Asia.)

### 20. CLÈTHRA, Gronov. WHITE ALDER.

Calyx of 5 sepals, imbricated in the bud. Corolla of 5 distinct obovate-oblong petals. Stamens 10, often exserted; anthers arrow-shaped, erect in the bud, becoming inverted and opening by basal pores or short slits. Style slender, 3-cleft at the apex. Capsule 3-valved, 3-celled, many-seeded, enclosed in the calyx. — Shrubs or trees, with alternate serrate deciduous leaves, and white flowers in terminal hoary racemes. Bracts deciduous. (Κλήθρα, the ancient Greek name of the Alder, which this genus somewhat resembles in foliage.)

1. **C. alnifòlia,** L. (SWEET PEPPERBUSH.) Shrub 3–10° high; *leaves wedge-obovate, sharply serrate*, entire toward the base, prominently straight-veined, smooth, green both sides, *racemes upright*, panicled; *bracts shorter than the flowers*: filaments smooth. — Wet copses, Maine to Va., near the coast, and southward. Covered in July and August with handsome fragrant blossoms.

2. **C. acuminàta,** Michx. A tall shrub or small tree; *leaves oval or oblong, pointed*, thin, finely serrate (3–7′ long), pale beneath; *racemes solitary, drooping; bracts longer than the flowers;* filaments and pods hairy. — Woods in the Alleghanies, Va. to Ga. July.

### 21. CHIMÁPHILA, Pursh. PIPSISSEWA.

Petals 5, concave, orbicular, widely spreading. Stamens 10; filaments enlarged and hairy in the middle; anthers as in Pyrola, but more or less conspicuously 2-horned. Style very short, inversely conical, nearly immersed in the depressed summit of the globular ovary; stigma broad and orbicular, disk-shaped, the border 5-crenate. Capsule, etc., as in Pyrola, but splitting from the apex downward, the edges of the valves not woolly. — Low, nearly herbaceous plants, with long running underground shoots, and evergreen thick and shining leaves, somewhat whorled or scattered along the short ascending stems; the fragrant (white or purplish) flowers corymbed or umbelled on a terminal peduncle. (Name from χεῖμα, *winter*, and φιλέω, *to love*, in allusion to one of the popular names, viz., *Wintergreen*.)

1. **C. umbellàta,** Nutt. (PRINCE'S PINE. PIPSISSEWA.) Leafy, 4–10′ high; *leaves wedge-lanceolate*, sharply serrate, *not spotted*; peduncles 4–7-flowered; petals flesh-color; anthers violet. — Dry woods, Nova Scotia to Ga., west to the Pacific. June. (Eu.)

2. **C. maculàta,** Pursh. (SPOTTED WINTERGREEN.) *Leaves ovate-lanceolate, obtuse at the base*, remotely toothed, *the upper surface variegated with white*; peduncles 1–5-flowered. — Dry woods, N. Eng. to Ga., west to Minn. and Miss. June, July. — Plant 3–6′ high.

### 22. MONÈSES, Salisb. ONE-FLOWERED PYROLA.

Petals 5, widely spreading, orbicular. Filaments awl-shaped, naked; anthers as in Pyrola, but conspicuously 2-horned. Style straight, exserted; stigma large, peltate, with 5 narrow and conspicuous radiating lobes. Valves of the capsule naked. (Flowers occasionally tetramerous.) Scape 1-flowered. Otherwise as Pyrola; intermediate between it and Chimaphila. (Name formed of μόνος, *single*, and ἧσις, *delight*, from the pretty solitary flower.)

1. **M. grandiflòra,** Salisb. A small perennial, with the rounded and veiny serrate thin leaves (6–9″ long) clustered at the ascending apex of creeping subterranean shoots; the 1–2-bracted scape (2–4′ high) bearing a white or rose-colored terminal flower 6″ wide. (M. uniflora, *Gray*.) — Deep cold woods, Labrador to Penn., Ind., Minn., and westward. June. (Eu.)

### 23. PÝROLA, Tourn. WINTERGREEN. SHIN-LEAF.

Calyx 5-parted, persistent. Petals 5, concave and more or less converging, deciduous. Stamens 10; filaments awl-shaped, naked: anthers extrorse in the bud, but in the flower inverted by the inflexion of the apex of the filament, more or less 4-celled, opening by a pair of pores at the blunt or somewhat 2-horned base (by inversion the apparent apex) Style generally long; stigma 5-lobed or 5-rayed. Capsule depressed-globose, 5-lobed, 5-celled, 5-valved from the base upward (loculicidal); the valves cobwebby on the edges. Seeds minute, innumerable, resembling sawdust, with a very loose cellular-reticulated coat. — Low and smooth perennial herbs, with running subterranean shoots, bearing a cluster of rounded petioled evergreen root-leaves, and a simple raceme of nodding flowers, on an upright more or less scaly-bracted scape. (Name a diminutive of *Pyrus*, the Pear-tree, from some fancied resemblance in the foliage.)

* *Style straight, much narrower than the peltate 5-rayed stigma, petals and stamens erect and connivent; anthers not narrowed below the openings.*

1. **P. minor,** L. Scape 5–10′ high; *leaves roundish*, slightly crenulate, thickish, mostly longer than the margined petiole flowers small, crowded, white or rose-color; calyx-lobes triangular-ovate, very much shorter than the

nearly *globose corolla: style short and included.* — Cold woods, Lab., White Mts., L. Superior, and northward.

2. **P. secúnda,** L. Subcaulescent, 3 – 6′ high; *leaves ovate, thin,* longer than the petiole, scattered, *finely serrate;* racemes dense and spike-like, the numerous small (greenish-white) *flowers all turned to one side,* scarcely nodding; calyx-lobes ovate, very much shorter than the oblong-oval petals; *style long, exserted.* — Rich woods, Lab. to Minn., south to Md., and far northward. July. (Eu.)

Var. **pùmila,** Gray, is a smaller form, with rounded leaves 6″ or little more in diameter, and 3 – 8-flowered scape. — High peat-bogs, N. Y. to L. Superior, and northward. July, Aug.

* * *Style strongly declined, the apex curved upward, longer than the connivent or spreading petals; stigma much narrower than the truncate excavated ring-like apex of the style; anthers contracted below the openings, forming a short neck; leaves denticulate or entire.*

+ *Petals and leaves acute, the latter ovate, coriaceous.*

3. **P. oxypétala,** C. F. Austin. Leaves ovate, small (8 – 12″ long), shorter than the slender petiole; scape (7 – 8′ high) several-flowered; flowers on ascending pedicels, not nodding; calyx-lobes triangular-ovate, acute, short; petals lanceolate-oblong, acuminate, greenish; anthers conspicuously mucronate at the apex, obtusely 2-horned at base, not inverted; style straightish, scarcely exserted. — Wooded hill near Deposit, Delaware Co., N. Y. (*C. F. Austin,* in 1860). Not since found; probably monstrous.

+ + *Petals and leaves orbicular to oblong, very obtuse.*

4. **P. chlorántha,** Swartz. *Leaves small* (1′ long), *roundish, thick, dull, shorter than the petiole; scape few-flowered,* naked (5 – 8′ high); *calyx-lobes roundish-ovate, very short;* the elliptical petals converging (greenish-white); *anther-cells contracted into a distinct neck;* style little exserted. — Open woods, Lab. to Penn., Minn., north and westward. June, July.

5. **P. ellíptica,** Nutt. (Shin-leaf.) *Leaves thin and dull, elliptical or obovate-oval, longer than the margined petiole;* raceme many-flowered; *calyx-lobes ovate, acute, not one fourth the length of the* obovate rather spreading (greenish-white) *petals: anther-cells blunt.* — Rich woods, N. Eng. to Md., Iowa, Minn., and northward. June.

6. **P. rotundifòlia,** L. *Leaves orbicular, thick, shining,* usually shorter than the petiole; scape many-bracted (6 – 12′ high); raceme elongated, many-flowered; *calyx-lobes lanceolate or oblong-lanceolate,* acutish, with somewhat spreading tips, *one half or one third the length of the* roundish-obovate rather spreading (chiefly white) *petals: anther-cells nearly blunt.* — Damp or sandy woods, throughout the continent, south to N. Ga. Exhibits many varieties, such as: Var. incarnàta, DC., with flesh-colored to rose-purple flowers, and triangular-lanceolate calyx-lobes. Cold woods and bogs, N. Eng. to Minn., and northward. — Var. asarifòlia, Hook., with oblate or round-reniform leaves, and shorter ovate calyx-lobes; petals flesh- or rose-colored (rarely white). With same range. — Var. uliginòsa, Gray, with short broadly ovate calyx-lobes, subcordate to obovate dull leaves, and rose-colored or purple flowers. Same range. (Eu.)

### 24. PTERÓSPORA, Nutt. PINE-DROPS.

Calyx 5-parted. Corolla ovate, urn-shaped, 5-toothed, persistent. Stamens 10; anthers 2-celled, awned on the back, opening lengthwise. Style short; stigma 5-lobed. Capsule globose, depressed, 5-lobed, 5-celled, loculicidal, but the valves cohering with the columella. Seeds very numerous, ovoid, tapering to each end, the apex expanded into a broad reticulated wing many times larger than the body of the seed. — A stout and simple purplish-brown clammy-pubescent root-parasitic herb (1 – 2° high); the wand-like stem furnished towards the base with scattered lanceolate scales in place of leaves, above bearing many nodding (white) flowers, in a long bracted raceme. (Name from *πτερόν, a wing,* and *σπορά, seed,* alluding to the singular wing borne by the seeds.)

1. **P. Andromedèa,** Nutt. — Hard clay soil, parasitic apparently on the roots of pines, from W. New Eng. to N. Penn., N. Mich., and westward; rare.

### 25. SCHWEINÍTZIA, Ell. SWEET PINE-SAP.

Calyx of 5 oblong-lanceolate acute scale-like sepals, erect, persistent. Corolla persistent, bell-shaped, rather fleshy, 5-lobed, slightly 5-gibbous at the base. Stamens 10; anthers much shorter than the filaments, fixed near the summit, awnless; the two sac-shaped cells opening at the top. Capsule ovoid, 5-celled, with a short and thick style, and a large 5-angular stigma. Seeds innumerable. — A low and smooth brownish plant, 3 – 4′ high, with the aspect of Monotropa, scaly-bracted, the flowers several in a terminal spike, at first nodding, flesh-color, with the fragrance of violets. (Named for the late *L. D. von Schweinitz.*)

1. **S. odoràta,** Ell. — Woods, parasitic on the roots of herbs, Md. (near Baltimore) to N. C. April.

### 26. MONÓTROPA, L. INDIAN PIPE. PINE-SAP.

Calyx of 2 – 5 lanceolate bract-like scales, deciduous. Corolla of 4 or 5 separate erect spatulate or wedge-shaped scale-like petals, which are gibbous or saccate at the base, and tardily deciduous. Stamens 8 or 10; filaments awl-shaped; anthers kidney-shaped, becoming 1-celled, opening across the top. Style columnar; stigma disk-like, 4 – 5-rayed. Capsule ovoid, 8 – 10-grooved, 4 – 5-celled, loculicidal; the very thick placentæ covered with innumerable minute seeds, which have a very loose coat. — Low and fleshy herbs, tawny, reddish, or white, parasitic on roots, or growing on decomposing vegetable matter like a Fungus; the clustered stems springing from a ball of matted fibrous rootlets, furnished with scales or bracts in place of leaves, 1 – several-flowered; the summit at first nodding, in fruit erect. (Name composed of *μόνος, one,* and *τρόπος, turn,* from the summit of the stem turned to one side.)

§ 1. MONOTROPA proper. *Plant inodorous, 1-flowered; calyx of* 2 – 4 *irregular scales or bracts; anthers transverse, opening equally by* 2 *chinks; style short and thick.*

1. **M. uniflòra,** L. (INDIAN PIPE. CORPSE-PLANT.) Smooth, waxy-white (turning blackish in drying, 3 – 8′ high); stigma naked. — Dark and rich woods, nearly throughout the continent. June – Aug. (Asia.)

§ 2. HYPÓPITYS. *Plant commonly fragrant; flowers several in a scaly raceme; the terminal one usually 5-merous, the rest 3–4-merous; bract-like sepals mostly as many as the petals; anthers opening by a continuous line into 2 very unequal valves; style longer than the ovary, hollow.*

2. **M. Hypópitys,** L. (PINE-SAP. FALSE BEECH-DROPS.) Somewhat pubescent or downy, tawny, whitish, or reddish (4–12′ high); pod globular or oval; stigma ciliate. — Oak and pine woods, from Canada to Fla., west to Oregon. June–Aug. (Eu.)

## ORDER 59. DIAPENSIÀCEÆ.

*Low perennial herbs or suffruticulose tufted plants, glabrous or nearly so, with simple leaves, no stipules, regular 5-merous flowers (except the 3-celled ovary), stamens adnate to the corolla and sometimes monadelphous (those opposite its lobes when present reduced to staminodia); pollen simple; loculicidal capsule and seeds of* Ericaceæ. — Flowers solitary or racemose. Style 1, with 3-lobed stigma. Distinguished from the Ericaceæ chiefly by the insertion of the stamens upon the corolla.

**Tribe I. DIAPENSIEÆ.** Dwarf woody evergreens, with small entire crowded coriaceous leaves. Staminodia none; filaments adnate to the campanulate corolla up to the sinuses; anthers 2-celled. Calyx conspicuously bracteolate. Flowers solitary.

1. **Pyxidanthera.** Flowers sessile on short leafy branchlets. Anther-cells awn-pointed at base, opening transversely.
2. **Diapensia.** Flower (or at least fruit) on a scape-like peduncle. Anther-cells blunt, obliquely dehiscent.

**Tribe II. GALACINEÆ.** Acaulescent, with creeping rootstocks sending up long-petioled evergreen leaves, and a 1–several-flowered scape. Staminodia present.

3. **Galax.** Calyx minutely 2-bracteolate. Stamens monadelphous: anthers 1-celled.

### 1. PYXIDANTHÈRA, Michx.

Sepals thin. Anther-cells awn-pointed at base, opening by a strictly transverse line. Otherwise much as in Diapensia. — Prostrate and creeping, with narrowly oblanceolate and awl-pointed leaves, mostly alternate on the sterile branches and somewhat hairy near the base. Flowers solitary and sessile, very numerous, white or rose-color. (Name from πυξίς, *a small box,* and ἀνθήρα, *anther,* the anther opening as if by a lid.)

1. **P. barbulàta,** Michx. (FLOWERING MOSS. PYXIE.) Leaves 3″ long. — Sandy pine barrens of N. J. to N. C. April, May.

### 2. DIAPÉNSIA, L.

Calyx of 5 concave imbricated coriaceous sepals. Corolla bell-shaped, 5-lobed; lobes rounded. Filaments broad and flat, adherent to the corolla up to the sinuses, short; anthers adnate, of 2 ovoid pointless cells, diverging below, each opening therefore by a transverse-descending line. Capsule, enclosed in the calyx, cartilaginous; cells few-seeded. — Alpine, growing in very dense convex tufts, with the stems imbricated below with cartilaginous narrowly spatulate mostly opposite leaves, terminated by a scape-like 1-flowered peduncle, 3-bracted under the calyx. Corolla white (½′ wide). (Said to be an ancient Greek name of the Sanicle, of obscure meaning, strangely applied by Linnæus to this plant.)

1. **D. Lappónica,** L. Leaves 3–5″ long; peduncle at length 1–2′ long. — Alpine summits of N. Eng. and N. Y., and northward to Lab. and the Arctic coast. July. (Eu., Asia.)

### 3. GÀLAX, L.

Calyx 5-parted, imbricate, persistent. Petals 5, hypogynous, obovate-spatulate, rather erect, deciduous. Filaments united in a 10-toothed tube, slightly cohering with the base of the petals, the 5 teeth opposite the petals naked, the alternate ones shorter and bearing roundish 1-celled anthers, which open across the top. Style short, stigma 3-lobed. Capsule ovoid, 3-celled; columella none. Seeds numerous, the cellular loose coat tapering to each end. — Evergreen herb, with a thick matted tuft of scaly creeping rootstocks, beset with fibrous red roots, sending up round-heart-shaped crenate-toothed and veiny shining leaves (about 2′ wide) on slender petioles, and a slender naked scape, 1–2° high, bearing a wand-like spike or raceme of small and minutely-bracted white flowers. (Name from γάλα, *milk,* — of no conceivable application to this plant.)

1. **G. aphýlla,** L. — Open woods, Va. to Ga. June.

## ORDER 60. PLUMBAGINÀCEÆ. (LEADWORT FAMILY.)

*Maritime herbs, with regular 5-merous flowers, a plaited calyx, the 5 stamens opposite the separate petals or the lobes of the corolla, and the free ovary one-celled, with a solitary ovule hanging from a long cord which rises from the base of the cell.* — Only the STATÍCEÆ or MARSH-ROSEMARY TRIBE is represented in our region, in gardens by the Thrift (*Armèria vulgàris*), on the coast by a single species of

### 1. STÁTICE, Tourn. SEA-LAVENDER. MARSH-ROSEMARY.

Flowers scattered or loosely spiked and 1-sided on the branches, 2–3-bracted. Calyx funnel-form, dry and membranaceous, persistent. Corolla of 5 nearly or quite distinct petals, with long claws, the 5 stamens severally attached to their bases. Styles 5, rarely 3, separate. Fruit membranous and indehiscent, in the bottom of the calyx. Embryo straight, in mealy albumen. — Sea-side perennials, with thick and stalked radical leaves; the naked flowering stems or scapes branched into panicles (Στατική, an ancient name given to this or some other herb, on account of its astringency.)

1. **S. Limònium,** L. Root thick and woody, very astringent; leaves oblong, spatulate or obovate-lanceolate, 1-ribbed, tipped with a deciduous bristly point, petioled; scape much-branched, corymbose-panicled (1–2° high); spikelets 1–3-flowered; flowers lavender-color; calyx-tube hairy on the angles, the lobes ovate-triangular, with as many teeth in the sinuses. (Eu.)

Var. **Caroliniàna,** Gray, the plant of the Northern States, has more erect branches, rather panicled inflorescence with at length scattered flowers, and very acute or acuminate calyx-lobes. — Salt marshes along the coast, from Lab. to Tex. Aug., Sept.

## ORDER 61. PRIMULÀCEÆ. (PRIMROSE FAMILY.)

*Herbs, with simple leaves, and regular perfect flowers, the stamens as many as the lobes of the monopetalous (rarely polypetalous) corolla and inserted opposite them* (on the tube or base), *and a 1-celled ovary with a central free placenta rising from the base, bearing several or many seeds.* — Calyx free from the ovary, or in Samolus partly coherent. (Corolla none in Glaux.) Stamens 4 or 5, rarely 6 or 8. Style and stigma one. Seeds with a small embryo in fleshy albumen. Ovules amphitropous, except in Tribe I.

**Tribe I. HOTTONIEÆ.** Ovary wholly free; ovules anatropous. Aquatic; immersed leaves pectinate.

1. **Hottonia.** Corolla short salver-form. Flowers verticillate and racemose.

**Tribe II. PRIMULEÆ.** Ovary wholly free.

* Stemless, leaves all in a cluster from the root; capsule dehiscent by valves or teeth.

2. **Dodecatheon.** Corolla reflexed, 5-parted. Stamens exserted, connivent in a cone.
3. **Primula.** Corolla funnel-form or salver-shaped, open at the throat. Stamens included.
4. **Androsace.** Corolla short, very small, constricted at the throat. Stamens included.

* * Stems leafy; corolla rotate (none in Glaux); leaves entire.

+ Capsule dehiscent vertically by valves or irregularly, mostly globose.

5. **Trientalis.** Corolla mostly 7-parted. Stem leafy only at the summit.
6. **Steironema.** Corolla 5-parted. Five slender staminodia between the fertile stamens.
7. **Lysimachia.** Corolla 5-6-parted or 5-6-petalled. Staminodia none. Leaves dotted
8. **Glaux.** Corolla none; the calyx petal-like. Flowers axillary.

+ + Globose capsule circumscissile, the top falling off as a lid; flowers axillary.

9. **Anagallis.** Corolla longer than the calyx, 5-parted. Leaves opposite.
10. **Centunculus.** Corolla shorter than the calyx, 4-5-cleft. Leaves alternate.

**Tribe III. SAMOLEÆ.** Ovary connate at base with the base of the calyx.

11. **Samolus.** Corolla bell-shaped, with 5 staminodia in the sinuses. Flowers racemose.

### 1. HOTTÒNIA, L. FEATHERFOIL. WATER VIOLET.

Calyx 5-parted, the divisions linear. Corolla salver-shaped, with a short tube, limb 5-parted. Stamens 5, included. Capsule many-seeded, 5-valved; the valves cohering at the base and summit. Seeds anatropous. — Aquatic perennials, with pectinate immersed leaves, and the erect hollow flower-stems almost leafless. Flowers white or whitish, whorled at the joints, forming an interrupted raceme. (Named for *Prof. Hotton*, a botanist of Leyden.)

1. **H. inflàta,** Ell. Leaves dissected into thread-like divisions, scattered on the floating and rooting stems, and crowded at the base of the cluster of peduncles, which are strongly inflated between the joints (often as thick as one's finger); pedicels short. — Pools and ditches, Mass. to S. Ind., and south to the Gulf. June - Aug.

### 2. DODECÀTHEON, L. AMERICAN COWSLIP.

Calyx deeply 5-cleft, the divisions lanceolate, reflexed. Corolla with a very short tube, thickened throat, and 5-parted reflexed limb; the divisions long and narrow. Filaments short, monadelphous at base; anthers long and linear, approximate in a slender cone. — Perennial smooth herb, with fibrous roots, a cluster of oblong or spatulate leaves, and a simple naked scape, involucrate with small bracts at the summit, bearing an ample umbel of showy flowers, nodding on slender pedicels. Corolla rose-color, or sometimes white. (Name from δώδεκα, *twelve*, and θεοί, *gods*, given by Pliny to the primrose, which was believed to be under the care of the superior gods.)

1. **D. Meàdia,** L. (Shooting-Star.) Rich woods, Penn. and Md. to Wisc., south to Ga. and Tex. May, June. — Very handsome in cultivation.

## 3. PRÍMULA, L. Primrose. Cowslip.

Calyx tubular, angled, 5-cleft. Corolla salver-shaped, enlarging above the insertion of the stamens; the 5 lobes often notched or inversely heart-shaped. Stamens 5, included. Capsule many-seeded, splitting at the top into 5 valves or 10 teeth. — Low perennial herbs, producing a tuft of veiny leaves at the root, and simple scapes, bearing the flowers in an umbel. (Name a diminutive of *primus*, from the flowering of the true Primrose in early spring.)

1. **P. farinòsa,** L. (Bird's-eye Primrose.) Scape 3 – 10′ high; leaves elliptical or obovate-lanceolate, denticulate, *the lower side* and the 3 – 20-flowered *involucre, etc., covered with a white mealiness*, at least when young; corolla pale lilac with a yellow eye. — Maine to N. shore of L. Superior, and northward. June, July. (Eu., Asia.)

2. **P. Mistassínica,** Michx. Scape 2 – 6′ high; leaves spatulate or wedge-oblong, thin and veiny, *not mealy;* involucre 1 – 8-flowered; lobes of the flesh-colored corolla broadly and deeply obcordate. — Wet banks and shores, northern N. Eng. and N. Y. to L. Superior, and northward. May. (Eu.)

## 4. ANDRÓSACE, Tourn.

Calyx 5-cleft; tube short. Corolla salver-shaped or funnel-form; the tube shorter than the calyx, contracted at the throat; limb 5-parted. Stamens and style included. Capsule 5-valved. — Small herbs, with clustered root-leaves, and very small solitary or umbelled flowers. (An ancient Greek name of a polyp, formerly believed to be a plant.)

1. **A. occidentàlis,** Pursh. Smoothish annual; scapes diffuse (2 – 4′ high), many-flowered; leaves and leaflets of the involucre oblong-ovate, entire, sessile; calyx-lobes leafy, triangular-lanceolate, longer than the (white) corolla. — Bare hills, from Minn. to Ill. and Ark., and west to the mountains.

## 5. TRIENTÀLIS, L. Chickweed-Wintergreen.

Calyx mostly 7-parted; the divisions linear-lanceolate, pointed. Corolla mostly 7-parted, spreading, flat, without tube. Filaments slender, united in a ring at the base; anthers oblong, revolute after flowering. Capsule few-seeded. — Low and smooth perennials, with simple erect stems, bearing a few alternate usually minute and scale-like leaves below, and a whorl of thin veiny leaves at the summit. Peduncles one or more, very slender, bearing a delicate white and star-shaped flower. (A Latin name, meaning the third part of a foot, alluding to the height of the plant.)

1. **T. Americàna,** Pursh. (Star-flower.) Spreading by very slender elongated rootstocks; leaves elongated-lanceolate, tapering to both ends; petals finely pointed. — Damp cold woods, from Lab. to Minn., south to N. Ind., and the mountains of Va. May. — Rootstocks often 1 – 2° long (*Hitchings*).

## 6. STEIRONÈMA, Raf.

Calyx 5-parted. Corolla rotate, with no proper tube, deeply 5-parted, the sinuses rounded; divisions ovate, cuspidate-pointed, erose-denticulate above, each separately involute around its stamen. Filaments distinct or nearly so on the ring at base of corolla, alternating with 5 subulate staminodia; anthers linear. Capsule 10 – 20 seeded. — Leafy-stemmed perennials, glabrous except the ciliate petioles, not punctate, the leaves all opposite, but mostly in seeming whorls on the flowering branches. Peduncles slender, axillary, bearing yellow flowers. (From στεῖρος, *sterile*, and νῆμα, *thread*, referring to the staminodia.)

1. **S. ciliàtum,** Raf. *Stem erect* (2 – 4° high); *leaves lanceolate-ovate* (2 – 6′ long), tapering to an acute point, *rounded or heart-shaped at base*, all on long and fringed petioles; *corolla longer than the calyx.* (Lysimachia ciliata, *L.*) — Low grounds and thickets, common. July.

2. **S. radìcans,** Gray. *Stem slender, soon reclined,* the elongated branches often rooting in the mud; *leaves ovate-lanceolate, mostly rounded at base, on slender petioles;* corolla about the length of the calyx. (Lysimachia radicans, *Hook.*) — Swampy river-banks, W. Va. to Ark. and La. — Leaves and flowers nearly one half smaller than in the last.

3. **S. lanceolàtum,** Gray. *Stem erect* (10′ – 2° high); *leaves lanceolate, varying to oblong and linear, narrowed into a short margined petiole* or tapering base, or the lowest short and broad on long petioles. (Lysimachia lanceolata, *Walt.*) — Low grounds and thickets, Ont. to Fla., Dak., and Tex. Polymorphous; the extremes are var. HÝBRIDUM, Gray, with cauline leaves from oblong to broadly linear, common north and west, — and var. ANGUSTIFÒLIUM, Gray, with stems more branched, a span to 2° high, and the cauline leaves linear, acute at both ends, more sessile, 1 – 2″ broad; mainly southward.

4. **S. longifòlium,** Gray. *Stem erect,* 4-angled, slender (1 – 3° high), often branched below; *stem-leaves sessile, narrowly linear, elongated* (2 – 4′ long, 2 – 3″ wide), smooth and shining, rather rigid, obtuse, the margins often a little revolute, the veins obscure; the lowest oblong or spatulate; corolla (8 – 9″ broad) longer than the calyx, the lobes conspicuously pointed. (Lysimachia longifolia, *Pursh.*) — Banks of streams, from western N. Y. to Va., Minn., and Iowa. July – Sept.

## 7. LYSIMÁCHIA, Tourn. LOOSESTRIFE.

Calyx 5 – 6-parted. Corolla rotate, the divisions entire, convolute in bud. Filaments commonly monadelphous at base; anthers oblong or oval; staminodia none. Capsule few – several-seeded. — Leafy-stemmed perennials, with herbage commonly glandular-dotted. (In honor of King *Lysimachus,* or from λύσις, *a release from*, and μάχη, *strife.*)

§ 1. LYSIMACHIA proper. *Corolla yellow, rotate, and very deeply parted, and with no teeth between the lobes; stamens more or less monadelphous, often unequal; leaves opposite or whorled, or some abnormally alternate.*

* *Flowers (middle-sized) in a terminal leafy panicle; corolla without marks.*

**L.** VULGÁRIS, L., a coarse and tall European species, pubescent and branching, with ovate-lanceolate distinctly petioled leaves, and glandular filaments united to near the middle. — Naturalized in a few places in E. Mass.

* * *Flowers (small) in a virgate terminal raceme or in the upper axils; corolla dark-dotted or streaked; filaments conspicuously monadelphous, unequal.*

1. **L. quadrifòlia,** L. Somewhat hairy; stem simple (1–2° high); *leaves whorled* in fours or fives (sometimes in twos, threes, or sixes, rarely only opposite or partly alternate), ovate-lanceolate; *flowers* on long capillary peduncles *from the axils of the leaves;* lobes of the corolla ovate-oblong. — Moist or sandy soil, N. Brunswick to Minn., and Ga. June.

2. **L. stricta,** Ait. Stems 1–2° high, often bearing oblong or moniliform bulblets in the axils; smooth, at length branched, very leafy; *leaves opposite* or rarely alternate, lanceolate, acute at each end; *flowers* on slender pedicels *in a long raceme* (5–12′), leafy at base; lobes of the corolla lance-oblong. — Low grounds, Newf. to Minn., Ark., and N. Ga. June–Aug.

* * * *Flowers (rather large) solitary in the axils of ordinary leaves; corolla not dark-dotted nor streaked; filaments slightly monadelphous.*

**L.** NUMMULÀRIA, L. (MONEYWORT.) Smooth: stems trailing and creeping; leaves roundish, small, short-petioled; peduncles axillary, 1-flowered; divisions of the corolla broadly ovate, obtuse, longer than the lance-ovate calyx-lobes and stamens. — Escaped from gardens into damp ground in some places. July–Sept. (Nat. from Eu.)

§ 2. NAUMBÚRGIA. *Corolla very deeply 5- (or 6–7-) parted into linear divisions (somewhat purplish-dotted), with a small tooth in each sinus; filaments distinct, equal; leaves opposite, the lowest scale-like.*

3. **L. thyrsiflòra,** L. (TUFTED LOOSESTRIFE.) Smooth; stem simple (1–2° high); all but the lower leaves lanceolate, the axils of one or two middle pairs bearing short-peduncled head-like or spike-like clusters of small light yellow flowers. — Cold swamps, from Penn. to S. Ill., Iowa, and northwestward. June, July. (Eu.)

## 8. GLAÙX, Tourn. SEA-MILKWORT.

Calyx bell-shaped, 5-cleft; lobes ovate, petal-like. Corolla wanting. Stamens 5, on the base of the calyx, alternate with its lobes. Capsule 5-valved, few-seeded. — A low and leafy fleshy perennial, with opposite oblong and entire sessile leaves, and solitary nearly sessile (purplish and white) flowers in their axils. (An ancient Greek name, from γλαυκός, *sea-green.*)

1. **G. marítima,** L. — Sea-shore of N. Eng. from Cape Cod northward. Also in subsaline soil, Minn. to Neb., and westward. June. (Eu.)

## 9. ANAGÁLLIS, Tourn. PIMPERNEL.

Calyx 5-parted. Corolla wheel-shaped, with almost no tube, 5-parted, longer than the calyx; the divisions broad. Stamens 5; filaments bearded. Capsule membranaceous, circumscissile, the top falling off like a lid, many-seeded. — Low, spreading or procumbent herbs, mostly annuals, with opposite or whorled entire leaves, and solitary flowers on axillary peduncles. (The ancient Greek name, probably from ἀνά, *again,* and ἀγάλλω, *to delight in.*)

**A.** ARVÉNSIS, L. (COMMON PIMPERNEL.) Leaves ovate, sessile, shorter than the peduncles; petals obovate, obtuse, fringed with minute teeth or stalked glands. — Waste sandy fields. June–Aug. — Flowers variable in size, scarlet, sometimes purple, blue, or white, quickly closing at the approach of bad weather; whence the English popular name of "*Poor Man's Weather-glass.*" (Nat. from Eu.)

### 10. CENTÚNCULUS, Dill. CHAFFWEED.

Calyx 4–5-parted. Corolla shorter than the calyx, 4–5-cleft, wheel-shaped, with an urn-shaped short tube, usually withering on the summit of the pod (which is like that of Anagallis). Stamens 4 or 5; filaments beardless. — Small annuals, with alternate entire leaves, and solitary inconspicuous flowers in their axils. (Derivation obscure.)

1. **C. mínimus,** L. Stems ascending (2–6′ long); leaves ovate, obovate, or spatulate-oblong; flowers nearly sessile, the parts mostly in fours. — Low grounds, from Ill. and Minn. to Fla. and Tex., and westward. (Eu.)

### 11. SÁMOLUS, Tourn. WATER PIMPERNEL. BROOK-WEED.

Calyx 5-cleft; the tube adherent to the base of the ovary. Corolla somewhat bell-shaped, 5-cleft, commonly with 5 sterile filaments in the sinuses. True stamens 5, on the corolla-tube, included. Capsule globose, 5-valved at the summit, many-seeded. — Smooth herbs, with alternate entire leaves, and small white racemed flowers. . ("According to Pliny, an ancient Druidical name.")

1. **S. Valerándi,** L. Stem erect (6–12′ high), leafy; leaves obovate or spatulate, the basal rosulate; bracts none; slender pedicels ascending, bracteolate in the middle. (Eu.) — Var. **Americànus,** Gray. More slender, becoming diffuse; racemes often panicled, the pedicels longer and spreading. — Wet places, through the U. S. June–Sept.

## ORDER 62. SAPOTÀCEÆ. (SAPODILLA FAMILY.)

*Trees or shrubs, mostly with a milky juice, simple and entire alternate leaves (often rusty-downy beneath), small and perfect regular flowers usually in axillary clusters; the calyx free and persistent; the fertile stamens commonly as many as the lobes of the hypogynous short corolla and opposite them, inserted on its tube, along with one or more rows of appendages and scales (or sterile stamens); anthers turned outward; ovary 4–12-celled, with a single anatropous ovule in each cell; seeds large.* — Albumen mostly none; but the large embryo with thickened cotyledons. Style single, pointed. — A small, mostly tropical order, producing the Sapodilla or Star-apple, and some other edible fruits.

### 1. BUMÈLIA, Swartz.

Calyx 5-parted. Corolla 5-cleft, with a pair of internal appendages at each sinus. Fertile stamens 5; anthers arrow-shaped. Sterile stamens 5, petal-like, alternate with the lobes of the corolla. Ovary 5-celled. Fruit small, resembling a cherry, black, containing a large ovoid and erect seed, with a roundish scar at its base. — Flowers small, white, in fascicles from the axils of the leaves. Branches often spiny. Leaves often fascicled on short spurs. Wood very hard. (The ancient name of a kind of Ash.)

1. **B. lycioìdes,** Pers. (SOUTHERN BUCKTHORN.) Spiny (10–25° high); *leaves wedge-oblong varying to oval-lanceolate,* with a tapering base, often acute, *reticulated, nearly glabrous* (2–4′ long); *clusters densely many-flowered,* glabrous, fruit ovoid. — Moist ground, Va. to S. Ill., Fla., and Tex. May, June.

2. **B. lanuginòsa**, Pers. Spiny (10–40° high); *leaves oblong-obovate or wedge-obovate, rusty-woolly beneath*, obtuse (1½–3′ long); *clusters* 6–12-*flowered*, pubescent; fruit globular. — Woods, S. Ill. to Fla. and Tex. July.

## ORDER 63. EBENÀCEÆ. (EBONY FAMILY.)

*Trees or shrubs, with alternate entire leaves, and polygamous regular flowers which have a calyx free from the* 3–12-*celled ovary; the stamens* 2–4 *times as many as the lobes of the corolla, often in pairs before them, their anthers turned inward, and the fruit a several-celled berry. Ovules* 1 *or* 2, *suspended from the summit of each cell.* Seeds anatropous, mostly single in each cell, large and flat, with a smooth coriaceous integument; the embryo shorter than the hard albumen, with a long radicle and flat cotyledons. Styles wholly or partly separate. — Wood hard and dark-colored. No milky juice. — A small family, chiefly tropical.

### 1. DIOSPỲROS, L. DATE-PLUM. PERSIMMON.

Calyx 4–6-lobed. Corolla 4–6-lobed, convolute in the bud. Stamens commonly 16 in the sterile flowers, and 8 in the fertile, in the latter imperfect. Berry large, globular, surrounded at base by the thickish calyx, 4–8-celled, 4–8-seeded. — Flowers diœciously polygamous, the fertile axillary and solitary, the sterile smaller and often clustered. (Name, Διός, *of Jove*, and πυρός, *grain*.)

1. **D. Virginiàna**, L. (COMMON PERSIMMON.) Leaves thickish, ovate-oblong, smooth or nearly so; peduncles very short; calyx 4-parted; corolla pale yellow, thickish, between bell-shaped and urn-shaped, 6–8″ long in the fertile flowers, much smaller in the sterile; styles 4, two-lobed at the apex; ovary 8-celled. — Woods and old fields, R. I. and N. Y. to Iowa, and south to Fla. and La. June. — Tree 20–70° high, with very hard blackish wood; plum-like fruit 1′ in diameter, exceedingly astringent when green, yellow when ripe, and sweet and edible after exposure to frost.

## ORDER 64. STYRACÀCEÆ. (STORAX FAMILY.)

*Shrubs or trees, with alternate simple leaves destitute of stipules, and perfect regular flowers; the calyx either free or adherent to the* 2–5-*celled ovary; the corolla of* 4–8 *petals, commonly more or less united at base; the stamens twice as many as the petals or more numerous, monadelphous or polyadelphous at base; style* 1; *fruit dry or drupe-like*, 1–5-*celled, the cells commonly* 1-*seeded.* — Seeds anatropous. Embryo nearly the length of the albumen; radicle slender, as long as or longer than the flat cotyledons. Corolla hypogynous when the calyx is free; the stamens adherent to its base. Ovules 2 or more in each cell. — A small family, mostly of warm countries, comprising two very distinct tribes.

**Tribe I. STYRACEÆ.** Calyx 4–8-toothed or entire. Stamens 2–4 times as many as the petals, in one series; anthers linear or oblong, adnate, introrse. Cotyledons flat. — Flowers white, handsome. Pubescence soft and stellate.

1. **Styrax.** Calyx coherent only with the base of the 3-celled ovary. Corolla mostly 5-parted. Fruit 1-celled, 1-seeded.

2. **Halesia.** Calyx coherent with the whole surface of the 2–4-celled ovary, which is 2–4-winged and 2–4-celled in fruit. Corolla 4-lobed.

**Tribe II. SYMPLOCINEÆ.** Calyx 5-cleft, imbricate. Stamens in several series; anthers short, innate. Embryo terete. Flowers yellow. Pubescence simple.

3. **Symplocos.** Calyx coherent. Petals 5, united merely at the base.

### 1. STỲRAX, Tourn. STORAX.

Calyx truncate, somewhat 5-toothed, the base (in our species) coherent with the base of the 3-celled many-ovuled ovary. Corolla 5-parted (rarely 4–8-parted), large; the lobes mostly soft-downy. Stamens twice as many as the lobes of the corolla; filaments flat, united at the base into a short tube; anthers linear, adnate. Fruit globular, its base surrounded by the persistent calyx, 1-celled, mostly 1-seeded, dry, often 3-valved. Seed globular, erect, with a hard coat. — Shrubs or small trees, with commonly deciduous leaves, and axillary or leafy-racemed white and showy flowers on drooping peduncles; produced in spring. Pubescence scurfy or stellate. (The ancient Greek name of the tree which produces *storax*.)

1. **S. grandifòlia,** Ait. Shrub 4–12° high; leaves obovate, acute or pointed, *white-tomentose beneath* (3–6′ long); *flowers mostly in elongated racemes;* corolla (⅓′ long) convolute-imbricated in bud. — Woods, S. Va. to Fla.

2. **S. pulverulénta,** Michx. Shrub 1–4° high; leaves oval or obovate (1 or 2′ long), *above sparingly puberulent, and scurfy-tomentose beneath; flowers* (½′ long) 1–3 *together in the axils* and at the tips of the branches, fragrant. — Low pine barrens, S. Va. to Fla. and Tex.

3. **S. Americàna,** Lam. Shrub 4–8° high; leaves oblong, acute at both ends (1–3′ long), *smooth, or barely pulverulent beneath; flowers axillary or in 3–4-flowered racemes* (½′ long); corolla valvate in the bud. — Along streams, Va. to Fla., La., and Ark.

### 2. HALÈSIA, Ellis. SNOWDROP or SILVER-BELL-TREE.

Calyx inversely conical, 4-toothed; the tube 4-ribbed, coherent with the 2–4-celled ovary. Petals 4, united at base, or oftener to the middle, into an open bell-shaped corolla, convolute or imbricated in the bud. Stamens 8–16; filaments united into a ring at base, and usually a little coherent with the base of the corolla; anthers linear-oblong. Ovules 4 in each cell. Fruit large and dry, 2–4-winged, within bony and 1–4-celled. Seeds single, cylindrical. — Shrubs or small trees, with large and veiny pointed deciduous leaves, and showy white flowers, drooping on slender pedicels, in clusters or short racemes, from axillary buds of the preceding year. Pubescence partly stellate. (Named for *Stephen Hales*, author of Vegetable Statics, &c.)

1. **H. tetráptera,** L. Leaves oblong-ovate; fruit 4-winged, 1½′ long. — Banks of streams, W. Va. to Ill., south to Fla.

### 3. SÝMPLOCOS, Jacq. SWEET-LEAF.

Calyx 5-cleft, the tube coherent with the lower part of the 3-celled ovary. Petals 5, imbricated in the bud, lightly united at base. Stamens very numerous, in 5 clusters, one cohering with the base of each petal; filaments slender; anthers very short. Fruit drupe-like or dry, mostly 1-celled and 1-seeded.

— Shrubs or small trees, the leaves commonly turning yellowish in drying, and furnishing a yellow dye. Flowers in axillary clusters or racemes, yellow. (Name σύμπλοκος, *connected*, from the union of the stamens.)

1. **S. tinctòria,** L'Her. (HORSE-SUGAR, &c.) Leaves elongated-oblong, acute, obscurely toothed, thickish, almost persistent, minutely pubescent and pale beneath (3 – 5′ long); flowers 6 – 14, in close and bracted clusters, odorous. — Rich ground, Del. to Fla. and La. April. — Leaves sweet, greedily eaten by cattle.

## ORDER 65. OLEÀCEÆ. (OLIVE FAMILY.)

*Trees or shrubs, with opposite and pinnate or simple leaves, a 4-cleft (or sometimes obsolete) calyx, a regular 4-cleft or nearly or quite 4-petalous corolla, sometimes apetalous; the stamens only 2 (rarely or accidentally 3 or 4); the ovary 2-celled, with 2 (rarely more) ovules in each cell.* — Seeds anatropous, with a large straight embryo in hard fleshy albumen, or without albumen. — The Olive is the type of the true Oleaceæ, to which belongs the Lilac (*Syringa*), etc.; and the Jessamine (*Jasminum*) represents another division of the order.

**Tribe I. FRAXINEÆ.** Fruit dry, indehiscent, winged, a samara. Leaves pinnate.

1. **Fraxinus.** Flowers diœcious, mostly apetalous, sometimes also without calyx.

**Tribe II. OLEINEÆ.** Fruit, a drupe, or rarely a berry. Leaves simple.

2. **Forestiera.** Flowers apetalous, diœcious or polygamous, from a scaly catkin-like bud. Stamens 2 - 4.
3. **Chionanthus.** Flowers complete, sometimes polygamous. Calyx and corolla 4-merous, the latter with long and linear divisions.
4. **Ligustrum.** Corolla funnel-form, 4-cleft, the tube longer than the calyx.

### 1. FRÁXINUS, Tourn. ASH.

Flowers polygamous or (in our species) diœcious. Calyx small and 4-cleft, toothed, or entire, or obsolete. Petals 4, or altogether wanting in our species. Stamens 2, sometimes 3 or 4; anthers linear or oblong, large. Style single; stigma 2-cleft. Fruit a 1 – 2-celled samara or *key-fruit*, flattened, winged at the apex, 1 - 2-seeded. Cotyledons elliptical; radicle slender. — Light timber-trees, with petioled pinnate leaves of 3 – 15 either toothed or entire leaflets; the small flowers in crowded panicles or racemes from the axils of last year's leaves. (The classical Latin name.)

* *Leaflets petiolulate; anthers linear-oblong; calyx small, persistent.*

+- *Fruit winged only at the upper part of the terete or nearly terete body.*

1. **F. Americàna,** L. (WHITE ASH.) *Branchlets and petioles glabrous;* leaflets 7 – 9, ovate- or lance-oblong, pointed, pale and either smooth or pubescent underneath, entire or sparingly serrate or denticulate; *fruit* (about 1½′ long) *marginless below, abruptly dilated into a lanceolate, oblanceolate, or wedge-linear wing* 2 or 3 times as long as the terete cylindraceous body. — Rich or moist woods, common from the Atlantic to Minn., E. Neb. and Kan. April, May — A large and very valuable forest tree, with gray furrowed bark, smooth gray branchlets and rusty-colored buds. Monœcious flowers rarely occur.

++ ++ *Body of fruit more slender, tapering gradually from summit to base, more or less margined upward by the decurrent wing.*

2. **F. pubéscens,** Lam. (RED ASH.) *Branchlets and petioles velvety-pubescent;* leaflets 7 – 9, ovate or oblong-lanceolate, taper-pointed, almost entire, pale or more or less pubescent beneath; *fruit* 1½ – 2′ *long, the edges gradually dilated into the linear or spatulate wing.* — Low grounds, throughout our range; rare west of Ohio. — Tree of middle or large size; inner face of outer bark of the branches red or cinnamon-color when fresh.

3. **F. víridis,** Michx. f. (GREEN ASH.) *Glabrous throughout; leaflets* 5 – 9, ovate or oblong-lanceolate, often wedge-shaped at the base and serrate above, *bright green both sides; fruit* much as in n. 2. — Along streams; common. — Intermediate forms occur with paler leaves somewhat pubescent beneath. A small or middle-sized tree.

+ + *Fruit with compressed and wing-margined body.*

4. **F. platycárpa,** Michx. (WATER-ASH.) *Branchlets terete,* glabrous or pubescent; leaflets 5 – 7, ovate or oblong, acute at both ends, short-stalked; *fruit broadly winged* (not rarely 3-winged), *oblong* (9″ wide), *with a tapering base.* — Deep river-swamps, Va. to La. March. Tree of middle size.

5. **F. quadrangulàta,** Michx. (BLUE ASH.) *Branchlets square,* at least on vigorous shoots, glabrous; leaflets 7 – 9, short-stalked, oblong-ovate or lanceolate, pointed, sharply serrate, green both sides; *fruit narrowly oblong, blunt, and of the same width at both ends,* or slightly narrowed at the base, often notched at the apex (1½′ long, 3 – 4″ wide). — Dry or moist rich woods, Ohio to Mich. and Minn., south to Tenn. — Large timber tree, the inner bark yielding a blue color to water.

* * *Lateral leaflets sessile; anthers short-oblong; flowers wholly naked.*

6. **F. sambucifòlia,** Lam. (BLACK ASH.) Branchlets and petioles glabrous; leaflets 7 – 11, oblong-lanceolate, tapering to a point, serrate, obtuse or rounded at the base, green and smooth both sides, when young with some rusty hairs along the midrib; fruit linear-oblong or narrowly elliptical, blunt at both ends. — Swamps and wet banks, N. Scotia to Minn., south to Va. and Mo. — Small or middle-sized tree, with very tough and fissile wood. Bruised foliage exhales the odor of Elder.

## 2. FORESTIÈRA, Poir.

Flowers diœcious, crowded in catkin-like scaly buds from the axils of last year's leaves, imbricated with scales. Corolla none. Calyx of 4 minute sepals. Stamens 2 – 4; anthers oblong Ovary ovate, 2-celled, with 2 pendulous ovules in each cell; style slender; stigma somewhat 2-lobed. Drupe small, ovoid, 1-celled, 1-seeded. — Shrubs, with opposite and often fascicled deciduous leaves and small flowers. Fertile peduncles short, 1 – 3-flowered. (Named for *M. Forestier,* a French physician.)

1. **F. acuminàta,** Poir. Glabrous, somewhat spinescent, 5 – 10° high; leaves thin, oblong-ovate or ovate-lanceolate, acuminate at both ends, often serrulate; drupe elongated-oblong, usually pointed. — Wet river banks, S. W. Ind. to Mo., south to Tex. April.

### 3. CHIONÁNTHUS, L. Fringe-tree.

Calyx 4-parted, very small, persistent. Corolla of 4 long and linear petals, which are barely united at base. Stamens 2 (rarely 3 or 4), on the very base of the corolla, very short. Stigma notched. Drupe fleshy, globular, becoming 1-celled, 1 – 3-seeded. — Low trees or shrubs, with deciduous and entire petioled leaves, and delicate flowers in loose and drooping graceful panicles, from lateral buds. (Name from *χιών*, *snow*, and *ἄνθος*, *blossom*, alluding to the light and snow-white clusters of flowers.)

1. **C. Virgínica,** L. Leaves oval, oblong, or obovate-lanceolate; flowers on slender pedicels; petals 1′ long, narrowly linear, acute, varying to 5 or 6 in number; drupe purple, with a bloom, ovoid (6 – 8″ long). — River banks, N. J. and S. Penn. to Fla., Tex., and Mo.; very ornamental in cultivation. June.

### 4. LIGÙSTRUM, Tourn. Privet.

Calyx short-tubular, 4-toothed, deciduous. Stamens 2, on the tube of the corolla, included. Berry 2-celled, 1 – 2 seeded. — Shrubs, with entire leaves and small white flowers in terminal panicles. (The classical name.)

**L.** VULGÀRE, L. (Privet, or Prim.) Leaves very smooth; berries black. — Used for low hedges, and naturalized eastward; from Europe.

## Order 66. APOCYNÀCEÆ. (Dogbane Family.)

*Plants almost all with milky acrid juice, entire (chiefly opposite) leaves without stipules, regular 5-merous and 5-androus flowers; the 5 lobes of the corolla convolute and twisted in the bud; the filaments distinct, inserted on the corolla, and the pollen granular;* calyx free from the two ovaries, which (in our genera) are distinct (forming follicles), though their styles or stigmas are united into one. — Seeds amphitropous or anatropous, with a large straight embryo in sparing albumen, often bearing a tuft of down (comose). — Chiefly a tropical family (of acrid-poisonous plants), represented in gardens by the Oleander and Periwinkle.

1. **Amsonia.** Seeds naked. Corolla-tube bearded inside. Anthers longer than the filaments. Leaves alternate.
2. **Trachelospermum.** Seeds comose. Corolla funnel-form, not appendaged. Filaments slender. Calyx glandular inside. Leaves opposite.
3. **Apocynum.** Seeds comose. Corolla bell-shaped, appendaged within. Filaments short, broad and flat. Calyx not glandular. Leaves opposite.

### 1. AMSÒNIA, Walt.

Calyx 5-parted, small. Corolla with a narrow funnel-form tube bearded inside, especially at the throat; the limb divided into 5 long linear lobes. Stamens 5, inserted on the tube, included; anthers obtuse at both ends, longer than the filaments. Ovaries 2; style 1; stigma rounded, surrounded with a cup-like membrane. Pod (follicles) 2, long and slender, many-seeded. Seeds cylindrical, abrupt at both ends, packed in one row, naked. — Perennial herbs, with *alternate leaves*, and pale blue flowers in terminal panicled cymes. (Said to be named for a *Mr. Charles Amson*.)

1. **A. Tabernæmontàna,** Walt. Loosely pubescent or hairy when young, soon glabrous; leaves from ovate-lanceolate to linear-lanceolate, taper-pointed; calyx-lobes short, awl-shaped; tube of the bluish corolla little longer than the lobes, the upper part either hairy when young or glabrous. — Low grounds, N. C. to S. Ind. and Mo., south to Fla. and Tex. May, June.

### 2. TRACHELOSPÉRMUM, Lemaïre.

Calyx 5-parted, with 3 – 5 glands at its base inside. Corolla funnel-form, not appendaged; limb 5-lobed. Stamens 5, included; filaments slender; anthers arrow-shaped, with an inflexed tip. Pods (follicles) 2, slender, many-seeded. Seeds oblong, with a tuft of down. — Twining plants, more or less woody, with opposite leaves and small flowers in cymes. (Name from *τράχηλος, a neck*, and *σπέρμα, seed*, upon the supposition that the seed was beaked.)

1. **T. diffórme,** Gray. Nearly herbaceous and glabrous; leaves oval-lanceolate, pointed, thin; calyx-lobes taper-pointed; corolla pale yellow. (Forsteronia difformis, *A. DC.*) — Damp grounds, Va. to Fla. and Tex. April.

### 3. APÓCYNUM, Tourn. DOGBANE. INDIAN HEMP.

Calyx 5-parted, the lobes acute. Corolla bell-shaped, 5-cleft, bearing 5 triangular appendages below the throat opposite the lobes. Stamens 5, on the very base of the corolla; filaments flat, shorter than the arrow-shaped anthers, which converge around the stigma, and are slightly adherent to it. Style none; stigma large, ovoid, slightly 2-lobed. Fruit of 2 long (2 – 7′) and slender follicles. Seeds comose, with a tuft of long silky down at the apex. — Perennial herbs, with upright branching stems, opposite mucronate-pointed leaves, a tough fibrous bark, and small and pale cymose flowers on short pedicels. (Ancient name of the Dogbane, composed of *ἀπό, from*, and *κύων, a dog*.)

1. **A. androsæmifòlium,** L. (SPREADING DOGBANE.) Smooth, or rarely soft-tomentose, branched above; *branches divergently forking: leaves ovate, distinctly petioled: cymes loose, spreading*, mostly longer than the leaves; *corolla* (pale rose-color, 4″ broad) *open-bell-shaped, with revolute lobes, the tube much longer than the ovate pointed divisions of the calyx.* — Borders of thickets; common. June, July.

2. **A. cannábinum,** L. (INDIAN HEMP.) Glabrous or more or less soft-pubescent; stem and branches *upright or ascending* (2 – 3° high), terminated by *erect and close many-flowered cymes*, which are usually shorter than the leaves; leaves from oval to oblong and even lanceolate, short-petioled or sessile, with rounded or obscurely cordate base; *corolla* (greenish-white) *with nearly erect lobes, the tube not longer than the lanceolate divisions of the calyx.* — Moist grounds and banks of streams; common. Very variable. July, Aug.

## ORDER 67. ASCLEPIADÀCEÆ. (MILKWEED FAMILY.)

*Plants with milky juice, and opposite or whorled (rarely scattered) entire leaves; the follicular pods, seeds, anthers (connected with the stigma), sensible properties, etc., just as in the last family, from which they differ in the* *commonly valvate corolla, and in the singular connection of the anthers with the stigma, the cohesion of the pollen into wax-like or granular masses* (pollinia), etc., as explained under the typical genus Asclepias.

PERÍPLOCA GRÆCA, L., a woody climbing plant of the Old World, in ornamental cultivation, and in one or two places inclined to be spontaneous, represents a tribe with granulose pollen loosely aggregated in two masses in each anther-cell. It has a brownish rotate corolla, very hairy within, and with 5 awned scales in the throat.

**Tribe I. CYNANCHEÆ.** Anthers tipped with an inflexed or sometimes erect scarious membrane, the cells lower than the top of the stigma; pollinia suspended.

* Stems erect or merely decumbent.

1 **Asclepiodora.** Corolla rotate, merely spreading. Crown of 5 hooded fleshy bodies, with a salient crest in each. Leaves alternate.

2. **Asclepias.** Corolla reflexed, deeply 5-parted. Crown as in n. 1, but with an incurved horn rising from the cavity of each hood. Leaves usually opposite.

3. **Acerates.** Corolla reflexed or merely spreading. Crown as in n. 1, but with neither crest nor horn inside. Leaves mainly alternate.

* * Stems twining. Leaves mostly opposite.

4. **Enslenia.** Corolla erect. Crown of 5 membranaceous flat bodies, terminated by a 2-cleft tail or awn.

5. **Vincetoxicum.** Corolla rotate, spreading. Crown a fleshy 5–10-lobed ring or disk.

**Tribe II. GONOLOBEÆ.** Anthers with short if any scarious tip, borne on the margin of or close under the disk of the stigma; pollinia horizontal.

6. **Gonolobus.** Corolla rotate. Crown a wavy-lobed fleshy ring. Stems twining.

## 1. ASCLEPIODÒRA, Gray.

Nearly as in Asclepias; but the corolla-lobes ascending or spreading, and the hoods destitute of a horn, widely spreading and somewhat incurved, slipper-shaped and laterally compressed, the cavity divided at the apex by a crest-like partition.—Umbels solitary and terminal or corymbed, loosely-flowered. Follicles oblong or ovate, often somewhat muricate with soft spinous projections. (Ἀσκληπιός and δῶρον or δωρεά, *the gift of Æsculapius.*)

1 **A. víridis,** Gray. Almost glabrous; stems short (1° high); leaves alternate, short-petioled, ovate-oblong to lanceolate, 1–2′ wide; umbels several in a cluster, short-peduncled; flowers large (1′ in diameter), green, with a purplish crown. (Acerates paniculata, *Decaisne.*)—Prairies, Ill. to Tex. and S. Car. June.

## 2. ASCLÈPIAS, L. MILKWEED. SILKWEED.

Calyx 5-parted, persistent; the divisions small, reflexed. Corolla deeply 5-parted, the divisions valvate in the bud, reflexed, deciduous. *Crown* of 5 hooded bodies seated on the tube of stamens, each containing an incurved horn. Stamens 5, inserted on the base of the corolla; filaments united in a tube which encloses the pistil; anthers adherent to the stigma, each with 2 vertical cells, tipped with a membranaceous appendage, each cell containing a flattened pear-shaped and waxy pollen-mass; the two contiguous pollen-masses of adjacent anthers, forming pairs which hang by a slender prolongation of their summits from 5 cloven glands that grow on the angles of the stigma (extricated from the cells by insects, and directing copious pollen-tubes into the point where the stigma joins the apex of the style). Ovaries 2, tapering into very short styles; the large depressed 5-angled fleshy stigmatic disk common to the two. Follicles 2, one of them often abortive, soft, ovate or lanceolate. Seeds anatropous, flat, margined, bearing a tuft of long silky hairs (*coma*) at the hilum, downwardly imbricated all over the large placenta, which separates from the suture at maturity. Embryo large, with broad foliaceous cotyledons in thin albumen. — Perennial upright herbs, with thick and deep roots; peduncles terminal or lateral and between the usually opposite petioles, bearing simple many-flowered umbels, in summer. (The Greek name of *Æsculapius*, to whom the genus is dedicated.)

§ 1. *Corneous anther-wings broadest and usually angulate-truncate and salient at base; horn conspicuous.*

* *Flowers orange-color; leaves mostly scattered; juice not milky.*

1. **A. tuberòsa,** L. (BUTTERFLY-WEED. PLEURISY-ROOT.) Roughish-hairy (1 – 2° high); stems erect or ascending, very leafy, branching at the summit, and bearing usually numerous umbels in a terminal corymb; leaves from linear to oblong-lanceolate, sessile or slightly petioled; divisions of the corolla oblong (greenish-orange); hoods narrowly oblong, bright orange, scarcely longer than the nearly erect and slender awl-shaped horns; pods hoary, erect on deflexed pedicels. — Dry fields, common, especially southward. — Var. DECÚMBENS, Pursh. Stems reclining; leaves broader and more commonly opposite, and umbels from most of the upper axils. — Ohio to Ga., etc.

* * *Corolla bright red or purple; follicles naked, fusiform, erect on the deflexed pedicels* (except in n. 5); *leaves opposite, mostly broad.*

+ *Flowers rather large; hoods about 3″ long and exceeding the anthers; leaves transversely veined.*

2. **A. paupércula,** Michx. Glabrous; stem slender (2 – 4° high); leaves elongated-lanceolate or linear (5 – 10′ long), tapering to both ends, slightly petioled, *umbels 5 – 12-flowered;* divisions of the red corolla narrowly oblong; the *bright orange hoods* broadly oblong, obtuse, much exceeding the incurved horn. — Wet pine-barrens on the coast, N. J. to Fla. and Tex.

3. **A. rùbra,** L. *Glabrous; leaves ovate or lanceolate and tapering from a rounded or heart-shaped base* to a very acute point, sessile or nearly so (2 – 6′ long, ½ – 2½′ wide), bright green; umbels many-flowered; divisions of the corolla and hoods *oblong-lanceolate, purple-red; the horn long and slender, straightish.* — Wet pine-barrens, etc., N. J. and Penn. to Fla., La., and Mo.

4. **A. purpuráscens,** L. (PURPLE M.) Stem rather slender (1 – 3° high); *leaves elliptical or ovate-oblong,* the upper taper-pointed, *minutely velvety-downy underneath,* smooth above, *contracted at base into a short petiole; pedicels* shorter than the peduncle, 3 – 4 *times the length of the dark purple lanceolate-ovate divisions of the corolla;* hoods oblong, abruptly narrowed above; *the horn broadly scythe-shaped, with a narrow and abruptly inflexed horizontal point.* — Dry ground, N. Eng. to Minn., Tenn., and southward. — Flowers 6″ long.

+ + *Flowers small; hoods 1″ long, equalling the anthers; veins ascending.*

5. **A. incarnàta,** L. (SWAMP MILKWEED.) Smooth, or nearly so, in the typical form, the stem with two downy lines above and on the branches

of the peduncles (2–3° high), very leafy; leaves oblong-lanceolate, acute or pointed, obtuse or obscurely heart-shaped at base; flowers rose-purple; hoods scarcely equalling the slender needle-pointed horn. — Swamps, common. — Var. PÚLCHRA, Pers.; leaves broader and shorter-petioled, more or less hairy-pubescent, as well as the stem. Milky juice scanty. — With the smooth form.

* * * *Flowers greenish, yellowish, white, or merely purplish-tinged: leaves opposite or whorled, or the upper rarely scattered.*

+- *Follicles echinate with soft spinous processes, densely tomentose (smooth, and only minutely echinate at the apex in* n. 8), *large (3–5′ long), ovate and acuminate, erect on deflexed pedicels; leaves large and broad, short-petioled; umbels terminal and lateral.*

6. **A. speciòsa,** Torr. Finely canescent-tomentose or glabrate, *the many-flowered umbel and calyx densely tomentose;* leaves *subcordate-oval* to oblong; corolla-lobes purplish, ovate-oblong, 4–5″ long; hoods 5–6″ long, with a short inflexed horn, *the truncate summit abruptly produced into a very long lanceolate-ligulate appendage.* — Along streams, Minn. to Ark., and westward.

7. **A. Cornùti,** Decaisne. (COMMON MILKWEED or SILKWEED.) Stem tall and stout, finely soft-pubescent; *leaves* oval-oblong (4–8′ long), pale, *minutely downy beneath, as well as the peduncles,* etc.; corolla-lobes dull purple to white, 3–4″ long; *hoods* rather longer than the anthers, *ovate, obtuse, with a tooth each side of the short stout claw-like horn.* — Rich ground, everywhere.

8. **A. Sullivántii,** Engelm. *Very smooth* throughout, tall; leaves ovate-oblong with a somewhat heart-shaped base, nearly sessile; *hoods obovate,* entire, *obtusely* 2-*eared at the base* outside; flowers larger (9″ long) and more purple than in the last; anther-wings 2-toothed at base; *pod* nearly glabrous, obscurely *spiny chiefly on the beak.* — Low grounds, Ohio to Kan. and Minn.

+- +- *Follicles wholly unarmed, either glabrous or tomentulose-pubescent,*

++ *Erect or ascending on the deflexed or decurved fruiting pedicels.*

= *Umbel solitary, on a naked terminal peduncle; leaves sessile, broad, transversely veined, wavy; glabrous and pale or glaucous.*

9. **A. obtusifòlia,** Michx. Stem 2–3° high; *leaves oblong with a heart-shaped clasping base,* very obtuse or retuse (2½–5′ long); peduncle 3–12′ long; corolla pale greenish purple; hoods truncate, somewhat toothed at the summit, shorter than the slender awl-pointed horn. — Sandy woods and fields, not rare, especially southward. A second umbel at the base of the peduncle occasionally occurs.

10. **A. Meádii,** Torr. Stem slender (1–2° high); leaves *ovate or oblong-ovate,* obtuse or acutish (1½–2½′ long), peduncle only twice the length of the upper leaves, pedicels rather short, corolla greenish-white, hoods rounded-truncate at summit, and with a sharp tooth at each margin, somewhat exceeding the stouter horn. — Dry ground, Ill. and Iowa. June.

= = *Umbels mostly more than one; peduncle not overtopping the leaves.*

*a. Leaves large, orbicular to oblong-lanceolate; hoods broad, little if at all exceeding the anthers; glabrous or some minute pubescence on young parts.*

11. **A. Jamèsii,** Torr. Stem stout (1° high or more); leaves about 5 pairs, approximate, *remarkably thick, rounded or broadly oval, often emarginate,*

*subcordate at base, nearly sessile*; umbels 2 – 3, densely many-flowered, on short peduncles, corolla-lobes ovate, *greenish*; hoods truncate, entire. — Plains of central Kansas and southwestward.

12. **A. phytolaccoides,** Pursh. (POKE-MILKWEED.) Stem 3 – 5° high; *leaves broadly ovate, or the upper oval-lanceolate and pointed at both ends, short-petioled*, smooth or slightly downy underneath (5 – 8′ long); lateral umbels several; *pedicels loose and nodding, numerous, long* and slender (1 – 3′ long), equalling the peduncle; *corolla-lobes* ovate-oblong, greenish; hoods (white) truncate, the margins 2-toothed at the summit, *the horn with a long projecting awl-shaped point.* — Moist copses, N. Eng. to Minn., south to Ga. and Ark.

13. **A. variegàta,** L. Stem 1 – 2° high; *leaves* (4 – 5 pairs) *ovate, oval, or obovate*, somewhat wavy, *contracted into short petioles*, middle ones sometimes whorled; *pedicels* (*numerous and crowded*) *and peduncle short, downy*; divisions of the *corolla ovate* (*white*); hoods orbicular, entire, purplish or reddish, the horn semilunar with a horizontal point. — Dry woods, southern N. Y. to Ind., south to Fla., Ark., and W. La. July. — Remarkable for its compact umbels of nearly white flowers.

*b. Leaves mostly pubescent or puberulent; hoods obtuse, entire, twice or thrice the length of the anthers.*

14. **A. ovalifòlia,** Decaisne. Low (6 – 18′ high), soft-downy, especially the lower surface of the ovate or lanceolate-oblong acute short-petioled leaves (1½ – 3′ long); umbels loosely 10 – 18-flowered, sessile or peduncled; pedicels slender, hoods oblong, yellowish, with a small horn, about the length of the oval greenish-white corolla-lobes (tinged with purple outside). — Prairies and oak-openings, N. Ill. and Iowa, to Wisc. and Dak.

++ ++ *Follicles and pedicels erect; leaves often whorled; glabrous or nearly so.*

= *Leaves ovate to broadly lanceolate, thin, rather slender-petioled.*

15. **A. quadrifòlia,** L. Stem slender (1 – 2° high), mostly leafless below, bearing usually *one or two whorls* of four in the middle and one or two pairs *of ovate or ovate-lanceolate* taper-pointed petioled leaves (2 – 4′ long); pedicels slender; corolla-lobes (*pale pink*) oblong; hoods white, elliptical-ovate, the incurved horn short and thick. — Dry woods and hills, N. Eng. to Minn., south to N. C. and Ark.

16. **A. perénnis,** Walt. Stems (1 – 2° high) *persistent or somewhat woody at the base; leaves lanceolate or lanceolate-ovate, tapering to both ends*, thin, rather slender-petioled; *flowers white*, small; the small hoods of the crown shorter than the needle-shaped horn; seeds sometimes destitute of a coma! — Low grounds, S. Ind. and Ill. to Tex., and eastward.

= = *Leaves narrowly linear to filiform; horn subulate, exserted; column conspicuous.*

17. **A. verticillàta,** L. Stems slender, simple or sparingly branched, very leafy to the summit; leaves filiform-linear, with revolute margins (2 – 3′ long, 1″ wide), 3 – 6 in a whorl; umbels small, lateral and terminal; divisions of the corolla ovate (greenish-white); hoods roundish-oval, about half the length of the incurved claw-shaped horns. — Dry hills, common, especially southward. — Var. PÙMILA, Gray, is low and many-stemmed from a fascicled root; leaves much crowded, filiform. — Dry plains, Neb. to Kan. and N. Mex.

§ 2. *Anther-wings broadly rounded at base and conspicuously auriculate-notched just above it; hoods with a minute horn exserted from the 2-lobed apex.*

18. **A. stenophýlla,** Gray. Puberulent, but foliage glabrous; stems slender (1 – 2° high), leaves narrowly linear (3 – 7′ long, 1 – 2½″ wide), the upper alternate, lower opposite; umbels several, short-peduncled, 10 – 15-flowered; corolla-lobes oblong, greenish; hoods whitish, equalling the anthers, conduplicate-concave; follicles erect on ascending pedicels. — Dry prairies, Neb. to E. Kan., south and westward.

## 3. ACERÀTES, Ell. GREEN MILKWEED.

Nearly as in Asclepias; but the hoods destitute of crest or horn (whence the name, from α privative, and κέρας, *a horn*). — Flowers greenish, in compact many-flowered umbels. Leaves opposite or irregularly alternate, short-petioled or sessile. Pollen-masses slender-stalked. Follicles smooth, slender.

* *Crown upon a short column and shorter than the globular mass of anthers and stigma, leaves mainly alternate-scattered.*

1. **A. longifòlia,** Ell. Minutely roughish-hairy or smoothish; stem erect (1 – 3° high), very leafy; leaves linear (3 – 7′ long); umbels lateral, on peduncles of about the length of the slender pedicels; flowers 3″ long when expanded. — Moist prairies and pine-barrens, Ohio to Minn., south to Fla. and Tex. July – Oct.

* * *Crown sessile, the oblong hoods nearly equalling the anthers; leaves often opposite and broader.*

2. **A. viridiflòra,** Ell. Minutely *soft-downy, becoming smoothish;* stems ascending (1 – 2° high); leaves oval to linear, thick (1½ – 4′ long); *umbels nearly sessile, lateral,* dense and globose; flower (when the corolla is reflexed) nearly ½′ long, short-pedicelled. — Dry soil, common, especially southward. July – Sept. — Runs into var. LANCEOLÀTA, Gray, with lanceolate leaves 2½ – 4′ long; — and var. LINEÀRIS, Gray, with elongated linear leaves and low stems; umbels often solitary. The latter form from Minn., Dak., and southward.

3. **A. lanuginòsa,** Decaisne. *Hairy,* low (5 – 12′ high); leaves lanceolate or ovate-lanceolate; *umbel solitary and terminal, peduncled;* flowers smaller; *pedicels slender.* — Prairies, N. Ill. to Minn., and westward. July.

## 4. ENSLÉNIA, Nutt.

Calyx 5-parted. Corolla 5-parted; the divisions erect, ovate-lanceolate. Crown of 5 free membranaceous leaflets, which are truncate or obscurely lobed at the apex, where they bear a pair of flexuous awns united at base. Anthers nearly as in Asclepias; pollen-masses oblong, obtuse at both ends, fixed below the summit of the stigma to the descending glands. Follicles oblong-lanceolate, smooth. Seeds with a tuft, as in Asclepias. — A perennial twining herb, smooth, with opposite heart-ovate and pointed long-petioled leaves, and small whitish flowers in raceme-like clusters, on slender axillary peduncles. (Dedicated to *A. Enslen,* an Austrian botanist who collected in the Southern United States early in the present century.)

1. **E. álbida,** Nutt. Climbing 8 – 12° high; leaves 3 – 5′ wide. — River-banks, S. Penn. and Va. to Ill., Mo., and Tex. July – Sept.

## 5. VINCETÓXICUM, Moench.

Calyx 5-parted. Corolla 5-parted, wheel-shaped. Crown flat and fleshy, disk-like, 5 – 10-lobed, simple. Anthers, smooth follicles and seeds much as in Asclepias. — Herbs, often twining. (Name from *vincens*, binding, and *toxicum*, poison.)

**V.** NÌGRUM, Moench. More or less twining, nearly smooth; leaves ovate or lance-ovate; flowers small, dark purple, in an axillary cluster, on a peduncle shorter than the leaves. — N. Eng. to Penn.; a weed escaping from gardens. (Adv. from Eu.)

## 6. GONÓLOBUS, Michx.

Calyx 5-parted. Corolla 5-parted, wheel shaped, sometimes reflexed-spreading; the lobes convolute in the bud. Crown small and fleshy, annular or cup-shaped, in the throat of the corolla. Anthers horizontal, partly hidden under the flattened stigma, opening transversely. Pollen-masses 5 pairs, horizontal. Follicles turgid, mostly muricate with soft warty projections, sometimes ribbed. Seeds with a coma. — Twining herbs or shrubs (ours herbaceous), with opposite heart-shaped leaves, and corymbose-umbelled greenish or dark purple flowers, on peduncles rising from between the petioles. Our species belong to the typical section, with the crown simple and unappendaged, and the corolla nearly veinless. (Name composed of *γωνία, an angle*, and *λοβος, a pod*, from the angled follicles of some species.)

* *Crown a low undulately* 10*-lobed fleshy disk; follicles unarmed, glabrous*, 3 – 5-*costate or angled.*

1. **G. suberòsus,** R. Br. Leaves cordate with an open shallow or sometimes deeper and narrow sinus, pointed, glabrate or hairy (3 – 5′ long); umbels 3 – 9-flowered, much shorter than the petiole; *corolla broadly conical in bud, abruptly pointed, twisted; lobes ovate* or triangular-lanceolate, *acute, pubescent inside; calyx half as long.* (G. macrophyllus, *Chapman.*) — Near the coast, Va. to Fla.

2. **G. lævis,** Michx. Leaves oblong-cordate with a deep and narrow open sinus, conspicuously acuminate (3 – 6′ long); umbels 5 – 10-flowered, barely equalling the petiole; *corolla elongated-conical in bud, not twisted; lobes narrowly or linear-lanceolate, obtuse, glabrous inside*, 3 – 4 *times as long as the calyx.* — South of our range. — Passes into var. MACROPHÝLLUS, Gray, with *larger* broadly cordate *leaves*, the *sinus often closed*, finely pubescent beneath. (G. macrophyllus, *Michx.*) — River-banks, Va. to S. Ind., Mo., S. C., and Tex.

* * *Crown cup-shaped, as high as the anthers; follicles muricate, not costate.*

+ *Crown fleshy, merely* 10*-crenate, or the crenatures bidentate.*

3. **G. oblìquus,** R. Br. Leaves rounded- to ovate-cordate with a narrow sinus, abruptly acuminate (3 – 8′ long); *umbel many-flowered; corolla in bud oblong-conical; its lobes linear-ligulate* (5 – 6″ long, 1″ wide), crimson-purple inside, dull or greenish and *minutely pubescent outside.* — River-banks, mountains of Penn. and Va., to Ohio and Mo. Flowers said to be fragrant.

4. **G. hirsùtus,** Michx. Commonly more hairy; leaves with the basal lobes sometimes overlapping; *peduncles fewer-flowered; corolla in bud ovate, its lobes elliptical-oblong* (3 – 4″ long), *barely puberulent outside*, dull or brownish-purple. — Md. and Va. to Tenn. and Fla.

← ← *Crown thinner, the border lobed or toothed; leaves as in the preceding.*

5. **G. Shórtii,** Gray. Resembles n. 3, but larger-leaved; corolla oblong-conical in bud, dark crimson-purple, its lobes ligulate (fully 6″ long); *crown about* 10-*toothed, the alternate teeth thinner, narrower and longer, either emarginate or* 2-*parted.* — Along the mountains, E. Ky. (*Short*) to N. W. Ga. (*Chapman*).

6. **G. Carolinénsis,** R. Br. Flower-bud oblong; corolla brownish-purple; its lobes oblong or linear-oblong (4 – 5″ long); *crown undulately and very obtusely* 5-*lobed and with a longer bifid subulate process in each sinus.* — From Va. to La., extending north to Ark. and central Mo.

## Order 68. LOGANIÀCEÆ. (Logania Family.)

*Herbs, shrubs, or trees, with opposite and entire leaves, and stipules or a stipular membrane or line between them, and with regular* 4 – 5-*merous* 4 – 5-*androus perfect flowers, the ovary free from the calyx*; a connecting group between Gentianaceæ, Apocynaceæ, Scrophulariaceæ (from all which they are known by their stipules) and Rubiaceæ, from which they differ in their free ovary; our representatives of the family are all most related to the Rubiaceæ, to which, indeed, they have been appended.

* Woody twiners; leaves evergreen; stigmas 4.

1. **Gelsemium.** Corolla large, the 5 lobes imbricated in the bud. Style slender.

* * Herbs; stigma single, entire or 2-lobed.

2. **Polypremum.** Corolla 4-lobed, not longer than the calyx, imbricated in the bud.
3. **Spigelia.** Corolla 5-lobed, valvate in the bud. Style single, jointed in the middle.
4. **Mitreola.** Corolla 5-lobed, valvate in the bud. Styles 2, short, converging, united at the summit, and with a common stigma.

### 1. GELSÉMIUM, Juss. Yellow (False) Jessamine.

Calyx 5-parted. Corolla open-funnel-form, 5-lobed; the lobes imbricated in the bud. Stamens 5, with oblong sagittate anthers. Style long and slender; stigmas 2, each 2-parted, the divisions linear. Capsule elliptical, flattened contrary to the narrow partition, 2-celled, septicidally 2-valved. Seeds many or several, winged. Embryo straight, in fleshy albumen; the ovate flat cotyledons much shorter than the slender radicle. — Smooth and twining shrubby plants with ovate or lanceolate leaves, minute deciduous stipules, and showy yellow flowers, of two sorts as to relative length of stamens and style. (*Gelsomino,* the Italian name of the Jessamine.)

1. **G. sempérvirens,** Ait. (Yellow Jessamine of the South.) Stem climbing high; leaves short-petioled, shining, nearly persistent; flowers in short axillary clusters; pedicels scaly-bracted; flowers very fragrant (the bright yellow corolla 1 – 1½′ long); capsule flat, pointed. — Low grounds, E. Va. to Fla. and Tex. March, April.

### 2. POLYPRÈMUM, L.

Calyx 4-parted; the divisions awl-shaped from a broad scarious-margined base. Corolla not longer than the calyx, almost wheel-shaped, bearded in the throat; the 4 lobes imbricated in the bud. Stamens 4, very short; anthers globular. Style 1, very short; stigma ovoid, entire. Capsule ovoid, a little flattened, notched at the apex, 2-celled, loculicidally 2-valved, many-seeded. — A smooth, diffuse, much-branched, small annual, with narrowly linear or awl-shaped leaves, connected at base by a slight stipular line; the small flowers solitary and sessile in the forks and at the ends of the branches; corolla inconspicuous, white. (Name altered from *πολύπρεμνος, many-stemmed.*)

1. **P. procúmbens,** L. — Dry fields, mostly in sandy soil, Md. to Tex.; also adventive in Penn. June – Oct.

### 3. SPIGÈLIA, L. PINK-ROOT. WORM-GRASS.

Calyx 5-parted; the lobes slender. Corolla tubular-funnel-form, 5-lobed at the summit, valvate in bud. Stamens 5; anthers linear. Style 1, slender, hairy above, jointed near the middle. Capsule short, 2-celled, twin, laterally flattened, separating at maturity from a persistent base into 2 carpels, which open loculicidally, few-seeded. — Chiefly herbs, with opposite leaves united by stipules, and the flowers spiked in one-sided cymes. (Named for *Adrian Spiegel*, latinized *Spigelius*, who wrote on botany early in the 17th century, and was perhaps the first to give directions for preparing an herbarium.)

1. **S. Marilándica,** L. (MARYLAND PINK-ROOT.) Stems simple and erect from a perennial root (6 – 18′ high); leaves sessile, ovate-lanceolate, acute; spike simple or forked, short; corolla 1½′ long, red outside, yellow within; tube 4 times the length of the calyx, the lobes lanceolate; anthers and style exserted. — Rich woods, N. J. to Wisc. and Tex. June, July. — A well-known officinal anthelmintic, and a showy plant.

### 4. MITRÈOLA, L. MITREWORT.

Calyx 5-parted. Corolla little longer than the calyx, somewhat funnel-form, 5-lobed, valvate in the bud. Stamens 5, included. Ovary at the base slightly adnate to the bottom of the calyx, 2-celled; styles 2, short, converging and united above by a common stigma. Capsule exserted, strongly 2-horned or mitre-shaped, opening down the inner side of each horn, many-seeded. — Annual smooth herbs, 6′ – 2° high, with small stipules between the leaves, and small white flowers spiked along one side of the branches of a terminal petioled cyme. (Diminutive of *mitra*, a mitre, from the shape of the pod.)

1. **M. petiolàta,** Torr. & Gray. Leaves thin, oblong-lanceolate, petioled. — Damp soil, from E. Va. to Tex.

## ORDER 69. GENTIANÀCEÆ. (GENTIAN FAMILY.)

*Smooth herbs, with a colorless bitter juice, opposite and sessile entire and simple leaves* (except in Tribe II.) *without stipules, regular flowers with the stamens as many as the lobes of the corolla, which are convolute (rarely imbricated and sometimes valvate) in the bud, a 1-celled ovary with 2 parietal placentæ, or nearly the whole inner face of the ovary ovuliferous; the fruit usually a 2-valved and septicidal many-seeded capsule.* — Flowers solitary or cymose (racemose in n. 8). Calyx persistent. Corolla mostly withering-persistent; the stamens inserted on its tube. Seeds anatropous, with a minute embryo in fleshy albumen. (Bitter-tonic plants.)

SUBORDER I. **Gentianeæ.** Leaves always simple and entire, sessile, never alternate. Æstivation of corolla never valvate.

* Lobes of corolla convolute in the bud.

+- Style filiform, usually deciduous; anthers oblong to linear, mostly twisting or curving in age.

1. **Erythræa.** Parts of flower 5 or 4; corolla salver-form; anthers twisting spirally.
2. **Sabbatia.** Parts of flower 5–12; corolla rotate; anthers recurved or revolute.
3. **Eustoma.** Parts of flower 5 or 6; corolla campanulate-funnel-form; anthers versatile, straight or recurving; calyx-lobes long-acuminate.

+- +- Style stout and persistent or none; anthers remaining straight.

4. **Gentiana.** Corolla funnel-form or bell-shaped, mostly plaited in the sinuses, without spurs or glands. Calyx 4–5-cleft.
5. **Frasera.** Corolla 4-parted, rotate; a fringed glandular spot on each lobe.
6. **Halenia.** Corolla 4–5-cleft, campanulate, and 4–5-spurred at the base.

* * Lobes of corolla imbricate in the bud; no appendages.

7. **Bartonia.** Calyx 4-parted. Corolla deeply 4-cleft, somewhat campanulate.
8. **Obolaria.** Calyx of 2 foliaceous sepals. Corolla 4-lobed, oblong-campanulate.

SUBORDER II. **Menyantheæ.** Leaves all alternate and mostly petioled, sometimes trifoliolate or crenate. Æstivation of corolla induplicate-valvate. Marsh or aquatic perennials.

9. **Menyanthes.** Corolla bearded inside. Leaves 3-foliolate.
10. **Limnanthemum.** Corolla naked, or bearded on the margins only. Leaves simple, rounded.

### 1. ERYTHRÆA, Richard. CENTAURY.

Calyx 4–5-parted, the divisions slender. Corolla funnel-form or salver-form, with slender tube and 4–5-parted limb. Anthers exserted, erect, twisting spirally. Style slender, single; stigma capitate or 2-lipped. — Low and small branching annuals, chiefly with rose-purple or reddish flowers (whence the name, from *ἐρυθρός, red*); in summer.

**E.** CENTAÙRIUM, Pers. (CENTAURY.) Stem upright (6–12′ high), *corymbosely branched* above; leaves oblong or elliptical, acutish, the basal rosulate, the uppermost linear; *cymes clustered, flat-topped, the flowers all nearly sessile*; tube of the (purple-rose-colored) corolla not twice the length of the oval lobes. — Waste grounds, shores of Lakes Ontario and Michigan. (Adv. from Eu.)

**E.** RAMOSÍSSIMA, Pers. Low (2–6′ high); *stem many times forked above and forming a diffuse cyme*; leaves ovate-oblong or oval, not rosulate below; *flowers all on short pedicels*; tube of the (pink-purple) corolla thrice the length of the elliptical-oblong lobes. — Wet or shady places, N. J., E. Penn., and southward. (Nat. from Eu.)

**E.** SPICÀTA, Pers. Stem strictly upright (6–10′ high); the *flowers sessile and spiked along one side of the simple or rarely forked branches*; leaves oval and oblong, rounded at base, acutish; tube of the (rose-colored or whitish) corolla scarcely longer than the calyx, the lobes oblong. — Sandy sea-shore, Nantucket, Mass., and Portsmouth, Va. (Nat. from Eu.)

### 2. SABBÀTIA, Adans.

Calyx 5–12-parted, the divisions slender. Corolla 5–12-parted, wheel-shaped. Stamens 5–12; anthers soon recurved. Style 2-cleft or -parted, slender. — Biennials or annuals, with slender stems, and cymose-panicled handsome (white or rose-purple) flowers, in summer. (Dedicated to *L. Sabbati*, an early Italian botanist.)

* *Corolla* 5-*parted, or rarely* 6 – 7-*parted.*

+ *Branches all opposite and stems more or less* 4-*angled; flowers cymose; calyx with long and slender lobes.*

++ *Corolla white, often turning yellowish in drying.*

1. **S. paniculàta,** Pursh. *Stem brachiately much-branched* (1 – 2° high); *leaves linear or the lower oblong, obtuse,* 1-*nerved,* nearly equalling the internodes; calyx-lobes much shorter than the corolla. — Low grounds, Va. to Fla.

2. **S. lanceolàta,** Torr. & Gray. *Stem simple* (2 – 3° high) bearing a flat-topped cyme; *leaves ovate-lanceolate or ovate,* 3-*nerved,* the upper acute, much shorter than the internodes; calyx-lobes longer and flowers larger than in n. 1. — Wet pine barrens, N. J. to Fla.

++ ++ *Corolla rose-pink, rarely white, with a yellowish or greenish eye.*

3. **S. brachiàta,** Ell. *Stem slightly angled,* simple below (1 – 2° high); *leaves linear and linear-oblong, obtuse,* or the upper acute; branches rather few-flowered, forming an oblong panicle; calyx-lobes nearly half shorter than the corolla. — Dry or low places, Ind. and N. C. to La. and Fla.

4. **S. angulàris,** Pursh. *Stem somewhat* 4-*winged-angled,* much branched above (1 – 2½° high), many-flowered; *leaves ovate,* acutish, 5-nerved, with a *somewhat heart-shaped clasping* base; calyx-lobes one third or half the length of the corolla. — Rich soil, N. Y. to Ont. and Mich., south to Fla. and La.

+ + *Branches alternate* (*or the lower opposite in* n. 5); *peduncles* 1-*flowered.*

++ *Calyx-lobes foliaceous.*

5. **S. calycòsa,** Pursh. Diffusely forking, pale, 1° high or less; leaves oblong or lance-oblong, narrowed at base; calyx-lobes spatulate-lanceolate (⅝ – 1′ long), exceeding the rose-colored or almost white corolla. — Sea-coast and near it, Va. to Tex.

++ ++ *Calyx-lobes slender and tube very short* (*prominently costate in* n. 6, *and longer, nearly or quite enclosing the retuse capsule*).

6. **S. campéstris,** Nutt. Span or two high, divergently branched above; leaves ovate with subcordate clasping base (½ – 1′ long), on the branches lanceolate; calyx equalling the lilac corolla (1½ – 2′ broad). — Prairies, S. E. Kan. and W. Mo. to Tex.

7. **S. stellàris,** Pursh. Loosely branched and forking; *leaves oblong to lanceolate,* the upper narrowly linear; *calyx-lobes awl-shaped-linear, varying from half to nearly the length of the bright rose-purple corolla;* style nearly 2-parted. — Salt marshes, Mass. to Fla. Appears to pass into the next; corolla in both at times pink or white.

8. **S. grácilis,** Salisb. *Stem very slender,* at length diffusely branched; branches and long peduncles filiform; *leaves linear,* or the lower lance-linear, the uppermost similar to the *setaceous calyx-lobes, which equal the rose-purple corolla;* style cleft to the middle. — Brackish marshes, Nantucket, Mass., and N. J., to Fla. and La.

9. **S. Ellióttii,** Steud. Effusely much branched; *leaves small,* lower cauline (6″ long or less) thickish, *from obovate to lanceolate,* upper narrowly linear and rather longer, on the flowering branches subulate; *calyx-lobes slen-*

*der-subulate, very much shorter than the white corolla;* style 2-parted. — Pine barrens, S. Va. (*!*) to Fla.

* * *Corolla* 8 – 12-*parted, large* (*about* 2′ *broad*).

10. **S. chloroides,** Pursh. Stem (1 – 2° high), loosely panicled above; peduncles slender, 1-flowered; leaves oblong-lanceolate; calyx-lobes linear, half the length of the deep rose-colored (rarely white) corolla. — Borders of brackish ponds, Mass. to Fla. and Ala.

### 3. EÙSTOMA, Salisb.

Calyx 5- (rarely 6-) parted; its lobes long-acuminate, with carinate midrib. Corolla campanulate-funnel-form, deeply 5 – 6-lobed. Anthers oblong, versatile, straight or recurving in age. Style filiform, nearly persistent; stigma of 2 broad lamellæ. — Glaucous large-flowered annuals, with more or less clasping and connate leaves, and slender terminal and more or less paniculate 1-flowered peduncles. (From εὖ, *well,* and στόμα, *mouth,* alluding to the open-mouthed corolla.)

1. **E. Russelliànum,** Griseb. One or two feet high; leaves from ovate-to lanceolate-oblong; lobes of lavender-purple corolla obovate ($1\frac{1}{2}$′ long), 4 times longer than the tube; anthers hardly curving in age. — Neb. to Tex.

### 4. GENTIÀNA, Tourn. GENTIAN.

Calyx 4 – 5-cleft. Corolla 4 – 5-lobed, regular, usually with intermediate plaited folds, which bear appendages or teeth at the sinuses. Style short or none; stigmas 2, persistent. Capsule oblong, 2-valved; the innumerable seeds either borne on placentæ at or near the sutures, or in most of our species covering nearly the whole inner face of the pod. — Flowers solitary or cymose, showy, in late summer and autumn. (Name from *Gentius,* king of Illyria, who used some species medicinally.)

§ 1. GENTIANÉLLA. *Corolla* (*not rotate*) *destitute of extended plaits or lobes or teeth at the sinuses: root annual.*

* (FRINGED GENTIANS.) *Flowers large, solitary on long terminal peduncles, mostly* 4-*merous; corolla campanulate-funnel-form, its lobes usually fimbriate or erose, not crowned; a row of glands between the bases of the filaments. Autumn-flowering.*

1. **G. crinita,** Froel. Stem 1 – 2° high; *leaves lanceolate or ovate-lanceolate from a partly heart-shaped or rounded base;* lobes of the 4-cleft calyx unequal, ovate and lanceolate, as long as the bell-shaped tube of the blue corolla (2′ long), the *lobes* of which are *wedge-obovate, and strongly fringed around the summit; ovary lanceolate.* — Low grounds, N. Eng. to Dak., south to Iowa, Ohio, and in the mountains to Ga.

2. **G. serràta,** Gunner. Stem 3 – 18′ high; *leaves linear or lanceolate-linear;* lobes of the 4- (rarely 5-) cleft calyx unequal, ovate or triangular and lanceolate, pointed; *lobes of the sky-blue corolla spatulate-oblong,* with ciliate-fringed margins, *the fringe shorter or almost obsolete at the summit; ovary elliptical or obovate.* (G. detonsa, *Manual.*) — Moist grounds, Newf. and W. New York, to Iowa and Minn., north and westward.

* * *Flowers smaller, 4 – 5-merous; corolla somewhat funnel-form or salver-form, its lobes entire: peduncles short or none, terminal and lateral on the acute-angled stem.*

3. **G. Amarélla,** L. Stems 2 – 20′ high; leaves lanceolate to narrowly oblong, or the lowest obovate-spatulate, the margins minutely scabrous; calyx-lobes (4 – 5) foliaceous, lanceolate or linear; corolla mostly blue, ½′ long or more, *with a fimbriate crown at the base of the oblong acute lobes; capsule sessile.* — Var. **acùta,** Hook. f. Calyx almost 5-parted; crown usually of fewer and sometimes very few setæ. — Lab. to N. Vt. and N. Minn., west and northward.

4. **G. quinqueflòra,** Lam. Stem rather slender, branching (1 – 2° high); leaves ovate-lanceolate from a partly clasping and heart-shaped base, 3 – 7-nerved, tipped with a minute point; branches racemed or panicled, about 5-flowered at the summit; lobes of the small 5-cleft calyx awl-shaped-linear; corolla pale blue, 6 – 9″ long, its lobes *triangular-ovate, bristle-pointed, without crown, but the glands at the base* of the slender obconical tube *manifest; capsule stipitate.* — Moist hills, Maine to Ont., Ill., and south along the mountains to Fla. — Var. OCCIDENTÀLIS, Gray. Sometimes 2 – 3° high, and paniculately much-branched; calyx-lobes more leaf-like, linear-lanceolate, reaching to the middle of the broader funnel-form corolla. — Va. and Ohio to Minn., south to Tenn. and La.

§ 2. PNEUMONÁNTHE. *Corolla (funnel-form or salver-form) with thin-membranaceous toothed or lobed plaits in the sinuses; no crown nor glands; capsule stipitate; autumn-flowering perennials, the flowers large, sessile or short pedunculate and bibracteate (except in* n. 12).

* *Anthers unconnected or soon separate; leaves rough-margined; seeds winged.*

5. **G. affìnis,** Griseb. *Stems clustered,* 1° high or less; leaves oblong or lanceolate to linear; *flowers numerous and thyrsoid-racemose* or few or rarely almost solitary; *calyx-lobes* unequal, the longest rarely equalling the tube, the shortest sometimes minute; corolla (blue or bluish) 1′ long or less, rather *narrowly funnel-form,* with ovate spreading lobes, the plaits with *conspicuous laciniate appendages sometimes equalling the lobes.* — Minn. to the Pacific.

6. **G. pubérula,** Michx. Stems (*mostly solitary*) erect or ascending (8 – 16′ high), mostly *rough* and minutely pubescent above; *leaves rigid,* linear-lanceolate to oblong-lanceolate (1 – 2′ long); *flowers clustered,* rarely solitary; *calyx-lobes lanceolate,* much shorter than the *bell-funnel-form open bright-blue corolla,* the spreading ovate *lobes* of which are *twice or thrice the length of the cut-toothed appendages.* — Dry prairies and barrens, western N. Y., Ohio, and Ky., to Minn. and Kan. Oct.

* * *Anthers cohering in a ring or short tube; flowers in terminal and often axillary clusters.*

+ *Calyx-lobes and bracts ciliolate-scabrous; seeds conspicuously winged; leaves rough-margined.*

7. **G. Saponària,** L. (SOAPWORT G.) Stem erect or ascending, smooth; leaves ovate-lanceolate, oblong, or lanceolate-obovate, narrowed at the base; *calyx-lobes linear or spatulate,* acute, *equalling or exceeding the tube,* half the length of the corolla; *lobes* of the club-bell-shaped light-blue corolla obtuse,

erect or converging, short and broad, but *distinct*, and more or less *longer than the conspicuous* 2-cleft and minutely toothed *appendages.* — Moist woods, N. Y. and N. J. to Minn., south to Fla. and La.

8. **G. Andréwsii,** Griseb. (CLOSED G.) Stems upright, smooth; leaves ovate-lanceolate and lanceolate from a narrower base, gradually pointed; *calyx-lobes lanceolate to ovate*, recurved, *shorter than the top-shaped tube*, and much shorter than the more oblong and truncate mostly blue corolla, which is closed at the mouth, *its proper lobes obliterated*, the apparent lobes consisting of the broad fringe-toothed and notched appendages. — Moist ground, N. Eng. to Minn., south to N. Ga. Corolla blue with white plaits, or sometimes all white.

+ + *Margins of leaves, bracts, etc., smooth and naked; terminal flower-cluster leafy-involucrate; seeds winged.*

9. **G. álba,** Muhl. Stems upright, stout; flowers sessile and crowded in a dense terminal cluster; leaves ovate-lanceolate from a heart-shaped closely clasping base, gradually tapering; calyx-lobes ovate or subcordate, many times shorter than the tube of the corolla, reflexed-spreading; corolla white more or less tinged with greenish or yellowish, inflated-club-shaped, at length open, its short and broad ovate lobes twice the length of the broad toothed appendages. — Low grounds and mountain meadows, Ont. to Ill., Ky., and Va.

10. **G. lineàris,** Froel. Stems slender and strict, 1-2° high; flowers 1-5 in the terminal cluster; leaves linear or narrowly lanceolate, with somewhat narrowed base; bracts sometimes very finely scabrous; calyx-lobes linear or lanceolate; corolla blue, narrow funnel-form, its erect roundish-ovate lobes little longer than the triangular acute appendages. (G. Saponaria, var. linearis, *Gray.*) — Bogs, mountains of Md. to N. Y., N. Eng., and northward.

Var. **lanceolàta,** Gray. Leaves lanceolate, or the upper and involucrate ones almost ovate-lanceolate, appendages of corolla sometimes very short and broad. — Minn. and L. Superior; also Herkimer Co., N. Y.

Var. **latifòlia,** Gray. Stout; leaves closely sessile, not contracted at base, the lowest oblong-linear, the upper ovate-lanceolate; appendages broad, acute or subtruncate. — L. Superior; N. Brunswick (flowers blue).

+ + + *Calyx-lobes and bracts with smooth margins or nearly so; seeds completely marginless.*

11. **G. ochroleùca,** Froel. Stems ascending, mostly smooth; leaves obovate-oblong, the lowest broadly obovate and obtuse, the uppermost somewhat lanceolate, all narrowed at base, calyx-lobes linear, unequal, much longer than its tube, rather shorter than the greenish-white open corolla, which is painted inside with green veins and lilac-purple stripes; its lobes ovate, very much exceeding the small and sparingly toothed oblique appendages. — Dry or damp grounds, Penn. to Fla. and La.

* * * *Anthers not connected: flowers terminal, solitary, commonly peduncled and naked; seeds wingless.*

12. **G. angustifòlia,** Michx. Stems slender and ascending (6-15′ high), mostly simple; leaves linear or the lower oblanceolate, rigid; corolla open-funnel-form (2′ long), azure-blue, also a greenish and white variety, about twice the length of the thread-like calyx-lobes, its ovate spreading lobes twice as long as the cut-toothed appendages. — Moist pine barrens, N. J. to Fla.

PLEURÓGYNE CARINTHÌACA, Griseb., var. PUSÍLLA, Gray, a low few-flowered annual, with rotate blue or bluish 4–5 parted corolla and a pair of scale-like appendages on the base of its divisions, is found from the Arctic Coast to the Lower St. Lawrence and Newfoundland, and was reported by Pursh from the summits of the White Mountains, but has not since been found.

### 5. FRÀSERA, Walt. AMERICAN COLUMBO.

Calyx deeply 4-parted. Corolla deeply 4-parted, wheel-shaped, each division with a glandular and fringed pit on the face. Filaments awl-shaped, usually somewhat monadelphous at base; anthers oblong, versatile. Style persistent; stigma 2-lobed. Capsule oval, flattened, 4–14-seeded. Seeds large and flat, wing-margined. — Tall and showy herbs, with a thick root, upright and mostly simple stems, bearing whorled leaves, and numerous peduncled flowers in open cymes, disposed in an ample elongated panicle. (Dedicated to *John Fraser*, an indefatigable collector in this country toward the close of the last century.)

1. **F. Carolinénsis,** Walt. Smooth biennial or triennial (3–8° high); leaves mostly in fours, lance-oblong, the lowest spatulate, veiny; panicle pyramidal, loosely flowered; corolla (1′ broad) light greenish-yellow, marked with small brown-purple dots, its divisions oblong, mucronate, longer than the narrowly lanceolate calyx-lobes, each with a large round gland below the middle; capsule much flattened parallel with the flat valves. — Rich dry soil, western N. Y. to Wisc., south to Ga.

### 6. HALÈNIA, Borkh. SPURRED GENTIAN.

Calyx 4–5-parted. Corolla short bell-shaped, 4–5-cleft, without folds or fringe, prolonged at the base underneath the erect lobes into spurs, which are glandular in the bottom. Stigmas 2, sessile, persistent on the oblong flattish capsule. Seeds rather numerous, oblong. — Small and upright herbs, with yellowish or purplish panicled-cymose flowers. (Named for *John Halen*, a German botanist.)

1. **H. defléxa,** Grisebach. Leafy annual or biennial (9–18′ high), simple or branched above; leaves 3–5-nerved, the lowest oblong-spatulate and petioled, the others oblong-lanceolate, acute; spurs cylindrical, obtuse, curved, descending, half the length of the acutely 4-lobed corolla. — Damp and cool woods, from N. Maine and W. Mass. to L. Superior, Minn., and northward.

### 7. BARTÒNIA, Muhl.

Calyx 4-parted. Corolla deeply 4-cleft, destitute of glands, fringes, or folds. Stamens short. Capsule oblong, flattened, pointed with a large persistent at length 2-lobed stigma. Seeds minute, innumerable, covering the whole inner surface of the pod. — Small annuals or biennials (3–10′ high), with thread-like stems, and little awl-shaped scales in place of leaves. Flowers small, white, peduncled. (Dedicated to *Prof. Benjamin Smith Barton*, of Philadelphia.)

1. **B. tenélla,** Muhl. Stems branched above, the branches or peduncles mostly opposite, 1–3-flowered; *lobes of the corolla oblong, acutish, rather longer than the calyx*, or sometimes twice as long; *anthers roundish*; ovary 4-angled, the cell somewhat cruciform. — Open woods, Newf. to Wisc., south to Va. and La. Aug. — Scales and branches occasionally alternate.

2. **B. vérna,** Muhl. Stem 1–few-flowered; flowers 3–4″ long, larger; *lobes of the corolla spatulate, obtuse, spreading, thrice the length of the calyx; anthers oblong;* ovary flat. — Bogs near the coast, S. Va. to Fla. and La. March.

## 8. OBOLÀRIA, L.

Calyx of 2 spatulate spreading sepals, resembling the leaves. Corolla tubular-bell-shaped, withering-persistent, 4-cleft; the lobes oval-oblong, or with age spatulate, imbricated in the bud! Stamens inserted at the sinuses of the corolla, short. Style short, persistent; stigma 2-lipped. Capsule ovoid, 1-celled, the cell cruciform; the seeds covering the whole face of the walls. — A low and very smooth purplish-green perennial (3–8′ high), with a simple or sparingly branched stem, opposite wedge-obovate leaves; the dull white or purplish flowers solitary or in clusters of three, terminal and axillary, nearly sessile; in spring. (Name from ὀβολός, a small Greek coin, from the thick rounded leaves.)

1. **O. Virgínica,** L. Herbaceous and rather fleshy, the lower leaves scale-like; flowers 4″ long. — Moist woods, N. J. to Ill., south to Ga. and Tex.

## 9. MENYÁNTHES, Tourn. BUCKBEAN.

Calyx 5-parted. Corolla short funnel-form, 5-cleft, deciduous, the whole upper surface white-bearded, valvate in the bud with the margins turned inward. Style slender, persistent; stigma 2-lobed. Capsule bursting somewhat irregularly, many-seeded. Seed-coat hard, smooth, and shining. — A perennial alternate-leaved herb, with a thickish creeping rootstock, sheathed by the membranous bases of the long petioles, which bear 3 oval or oblong leaflets; the flowers racemed on the naked scape (1° high), white or slightly reddish. (The ancient Theophrastian name, probably from μήν, *month*, and ἄνθος, *a flower*, some say from its flowering for about that time.)

1. **M. trifoliàta,** L. — Bogs, N. J. and Penn. to Ind. and Iowa, and far north and westward. May, June. (Eu., Asia.)

## 10. LIMNÁNTHEMUM, Gmelin. FLOATING HEART.

Calyx 5-parted. Corolla almost wheel-shaped, 5-parted, the divisions fringed or bearded at the base or margins only, folded inward in the bud, bearing a glandular appendage near the base. Style short or none; stigma 2-lobed, persistent. Capsule few–many-seeded, at length bursting irregularly. Seed-coat hard. — Perennial aquatics, with rounded floating leaves on very long petioles, which, in most species, bear near the summit the umbel of (polygamous) flowers, along with a cluster of short and spur-like roots, sometimes shooting forth new leaves from the same place, and so spreading by a sort of proliferous stolons; flowering all summer. (Name compounded of λίμνη, *a marsh* or *pool*, and ἄνθεμον, *a blossom*, from the situations where they grow.)

1. **L. lacunòsum,** Grisebach. *Leaves entire,* round-heart-shaped (1–2′ broad), thickish; petioles filiform; lobes of the (white) corolla broadly oval, naked, except the crest-like yellowish gland at the base, twice the length of the lanceolate calyx-lobes; style none; *seeds smooth and even.* — Shallow water, from Maine to Minn., south to Fla. and La.

2. **L. trachyspérmum,** Gray. *Leaves larger* (2–6′ broad) and rounder, thicker, often wavy-margined or crenate, roughish and dark-punctate or pitted beneath; petioles stouter; *seeds glandular-roughened.* — Ponds and streams, Md. and Va. to Fla. and Tex.

## ORDER 70. POLEMONIÀCEÆ. (POLEMONIUM FAMILY.)

*Herbs, with alternate or opposite leaves, regular 5-merous and 5-androus flowers, the lobes of the corolla convolute in the bud, a 3-celled ovary and 3-lobed style; capsule 3-celled, 3-valved, loculicidal, few–many-seeded: the valves usually breaking away from the triangular central column.* — Seeds amphitropous, the coat frequently mucilaginous when moistened and emitting spiral threads. Embryo straight in the axis of copious albumen. Calyx persistent, imbricated. Corolla with a 5-parted border. Anthers introrse. (Insipid and innocent plants; many are ornamental in cultivation.)

1. **Phlox.** Corolla salver-form. Calyx narrow. Leaves opposite, entire.
2. **Gilia.** Corolla tubular-funnel-form or salver-form. Calyx narrow, partly scarious. Leaves mostly alternate, entire.
3. **Polemonium.** Corolla open-bell-shaped. Calyx herbaceous, bell-shaped. Filaments slender, equal. Leaves alternate, pinnate or pinnately parted.

### 1. PHLOX, L.

Calyx narrow, somewhat prismatic, or plaited and angled. Corolla salver-form, with a long tube. Stamens very unequally inserted in the tube of the corolla, included. Capsule ovoid, with sometimes 2 ovules but ripening only a single seed in each cell. — Perennials (except a few southern species, such as P. Drummondii of the gardens), with opposite and sessile perfectly entire leaves, the floral often alternate. Flowers cymose, mostly bracted; the open clusters terminal or crowded in the upper axils. (Φλόξ, *flame,* an ancient name of Lychnis, transferred to this North American genus.) Most of our species are cultivated in gardens.

§ 1. *Herbaceous, with flat (broad or narrow) leaves.*

* *Stem strictly erect; panicle pyramidal or oblong, many-flowered; peduncles and pedicels very short; corolla-lobes entire. (Very common in gardens.)*

1. **P. paniculàta,** L. Stem stout (2–4° high), smooth; leaves oblong-lanceolate and ovate-lanceolate, pointed, large, tapering at the base, the upper often heart-shaped at the base; *panicle ample, pyramidal-corymbed; calyx-teeth awn-pointed:* corolla pink-purple varying to white. — Open woods, Penn. to Ill., south to Fla. and La. June, July.

2. **P. maculàta,** L. (WILD SWEET-WILLIAM.) Smooth, or barely roughish; *stem spotted with purple,* rather slender (1–2° high); lower leaves lanceolate, the upper nearly ovate-lanceolate, tapering to the apex from the broad and rounded or somewhat heart-shaped base; *panicle narrow, oblong,* leafy below; *calyx-teeth triangular-lanceolate, short, scarcely pointed;* corolla pink-purple. — Rich woodlands and along streams, N. J. and N. Penn. to Minn., south to Fla. and Ark. — Var. CÁNDIDA, Michx., is a white-flowered form, commonly with spotless stem. With the ordinary form.

* * *Stems, at least the flowering ones, ascending or erect; flowers in corymbed or simple cymes; corolla-lobes obovate or obcordate.*

+- *Calyx-teeth triangular-subulate; corolla-lobes rounded, entire; glabrous or nearly so.*

3. **P. ovàta,** L. Stems ascending (½ – 2° high), often from a prostrate base; *leaves oblong-lanceolate, or the upper ovate-lanceolate,* and sometimes heart-shaped at the base, acute or pointed; flowers pink or rose-red, crowded, short-peduncled; *calyx-teeth* short and broad, *acute.* (P. Carolina, *L.*) — Open woods, in the mountain region from Penn. to Ala. June, July.

4. **P. glabérrima,** L. Stems slender, erect (1 – 3° high); *leaves linear-lanceolate or rarely oblong-lanceolate,* very smooth (except the rough and sometimes revolute margins), tapering gradually to a point (3 – 4′ long); cymes few-flowered and loosely corymbed; flowers peduncled (pink or whitish); *calyx-teeth* narrower and very *sharp-pointed.* — Prairies and open woods, N. Va. to Ohio and Minn., south to Fla. and Mo. July.

+- +- *Calyx-teeth long and slender; more or less hairy or glandular-pubescent.*

++ *No runners or prostrate sterile shoots.*

5. **P. pilòsa,** L. Stems slender, nearly erect (1 – 1½° high), usually hairy, as are the *lanceolate or linear leaves* (1 – 4′ long), which commonly *taper to a sharp point;* cymes at length open; *calyx-teeth slender awl-shaped and awn-like,* longer than the tube, loose or spreading; lobes of the pink-purple or rose-red (rarely white) corolla obovate, entire. — Dry or sandy woods, prairies, etc., N. J. to Minn., south to Fla. and Tex. May, June.

6. **P. amœna,** Sims. Stems ascending (½ – 1½° high), mostly simple; *leaves broadly linear, lanceolate or ovate-oblong,* abruptly acute or blunt (½ – 1½′ long), on sterile shoots often ovate; *cyme mostly compact and sessile, leafy-bracted; calyx-teeth awl-shaped or linear,* sharp-pointed, but seldom awned, rather longer than the tube, straight; lobes of the corolla obovate and entire (or rarely notched), purple, pink, or sometimes white. (P. procumbens, *Gray;* not *Lehm.*) — Dry hills and barrens, Va. to Ky., south to Fla.

++ ++ *Sterile shoots from the base creeping or decumbent; leaves rather broad.*

7. **P. réptans,** Michx. *Runners creeping,* bearing *roundish-obovate* smoothish and thickish leaves; flowering stems (4 – 8′ high) and their *oblong or ovate obtuse leaves* (½′ long) *pubescent,* often clammy; cyme close, few-flowered; calyx-teeth linear-awl-shaped, about the length of the tube; *lobes of the reddish-purple corolla round-obovate, mostly entire.* — Damp woods, in the Alleghany region, Penn. to Ky. and Ga. May, June.

8. **P. divaricàta,** L. Stems spreading or ascending from a decumbent base (9 – 18′ high); *leaves oblong- or lance-ovate* or the lower oblong-lanceolate (1½′ long), acutish; cyme corymbose-panicled, spreading, loosely-flowered; calyx-teeth slender awl-shaped, longer than the tube; *lobes of the pale lilac or bluish corolla obcordate or wedge-obovate and notched* at the end, or *often entire,* ½ – ⅔′ long, equalling or longer than the tube, with rather wide sinuses between them. — Rocky damp woods, W. Canada and N. Y. to Minn., south to Fla. and Ark. May. — A form occurs near Crawfordsville, Ind., with reduced flowers, the narrow entire acuminate corolla-lobes scarcely half as long as the tube.

* * * *Stems low, diffuse and branching; flowers scattered or barely cymulose; corolla-lobes narrowly cuneate, bifid; calyx-lobes subulate-lanceolate.*

9. **P. bífida,** Beck. *Minutely pubescent;* stems ascending, branched (5 – 8′ high); leaves linear, becoming nearly glabrous (½ – 1½′ long, 1½″ wide); flowers few, on slender peduncles; calyx-teeth awl-shaped, about as long as the tube; *lobes of the pale purple corolla 2-cleft to or below the middle* (4″ long), equalling the tube, the *divisions linear-oblong.* — Prairies of Ind. to Iowa and Mo.

10. **P. Stellària,** Gray. *Very glabrous;* leaves barely somewhat ciliate at base, linear (1 – 2′ long, 1″ wide or more), acute, rather rigid; flowers scattered, mostly long-peduncled; *lobes of the pale blue or almost white corolla bifid at the apex into barely oblong lobes.* — Cliffs of Ky. River (*Short*), S. Ill., and Tenn. (*Gattinger*). May.

§ 2. *Suffruticulose and creeping-cespitose, evergreen, with mostly crowded and fascicled subulate and rigid leaves.*

11. **P. subulàta,** L. (Ground or Moss Pink.) Depressed, in broad mats, pubescent (glabrate when old); leaves awl-shaped, lanceolate, or narrowly linear (3 – 6″ long); cymes few-flowered; calyx-teeth awl-shaped, rigid; corolla pink-purple or rose-color with a darker centre (sometimes white); lobes wedge-shaped, notched, rarely entire. — Dry rocky hills and sandy banks, southern N. Y. to Mich., south to Fla. and Ky.

## 2. GÍLIA, Ruiz & Pav.

Calyx-lobes narrow and acute, the tube scarious below the sinuses. Corolla tubular-funnel-form or salver-form. Stamens equally or unequally inserted. Capsule with solitary to numerous seeds. — Mostly herbs with alternate leaves. Our species belongs to the § *Collomia*, in which the flowers are capitate-glomerate and foliose-bracted or scattered, stamens unequally inserted in the narrow tube of the salver-form corolla, ovules solitary, and leaves sessile and entire; annuals. (Dedicated to *Philip Gil*, a Spanish botanist.)

1. **G. lineàris,** Gray. Branching and in age spreading, 6 – 18′ high; leaves linear- or oblong-lanceolate; calyx-lobes triangular-lanceolate, acute; corolla 6″ long, from lilac-purple to nearly white, very slender, with small limb. (Collomia linearis, *Nutt.*) — From Minn. west to the Pacific.

## 3. POLEMÒNIUM, Tourn. Greek Valerian.

Calyx bell-shaped, herbaceous. Stamens equally inserted at the summit of the very short tube of the open-bell-shaped or short funnel-form corolla; filaments slender, declined, hairy-appendaged at the base. Capsule few – several-seeded. — Perennials, with alternate pinnate leaves, the upper leaflets sometimes confluent; the (blue or white) corymbose flowers nearly bractless. (An ancient name, from πόλεμος, *war*, of doubtful application.)

1. **P. réptans,** L. Smooth throughout or slightly pubescent; stems weak and spreading (6 – 10′ high, never creeping as the name denotes); leaflets 5 – 15, ovate-lanceolate or oblong; corymbs few-flowered; flowers nodding; calyx-lobes ovate, shorter than the tube; *stamens and style* included; corolla light blue, about ½′ wide; *capsules about 3-seeded.* — Woods, N. Y. to Minn., south to Ala. and Mo. May, June.

2. **P. cærùleum,** L. (Jacob's Ladder.) Stem erect (1–3° high); leaflets 9–21, linear-lanceolate, oblong- or ovate-lanceolate, mostly crowded; flowers numerous, in a thyrsus or contracted panicle; lobes of the calyx longer than the tube; *stamens and style mostly exserted* beyond the bright blue corolla, which is nearly 1′ broad; capsule several-seeded. — Rare in our range, occurring in swamps and on mountains in N. H., N. Y., N. J., and Md., but common in the western mountains and far northward.

## Order 71. HYDROPHYLLÀCEÆ. (Waterleaf Family.)

*Herbs, commonly hairy, with mostly alternate leaves, regular 5-merous and 5-androus flowers, in aspect between the foregoing and the next order; but the ovary entire and 1-celled with 2 parietal 4–many-ovuled placentæ, or rarely 2-celled by the union of the placentæ in the axis; style 2-cleft, or 2 separate styles; fruit a 2-valved 4–many-seeded capsule.* — Seeds mostly reticulated or pitted. Embryo small in copious albumen. — Flowers chiefly blue or white, in one-sided cymes or false racemes, which are mostly bractless and coiled from the apex when young, as in the Borage Family. A small order of plants of no marked properties; some cultivated for ornament.

**Tribe I. HYDROPHYLLEÆ.** Ovary and capsule 1-celled. Seeds pitted or reticulated; albumen cartilaginous. Leaves cut-toothed, lobed or pinnate. Style 2-cleft.

* Ovary lined with the dilated and fleshy placentæ, which enclose the ovules and seeds (in our plants only 4) like an inner pericarp.

1. **Hydrophyllum.** Stamens exserted; anthers linear. Calyx unchanged in fruit.
2. **Nemophila.** Stamens included; anthers short. Calyx with appendages at the sinuses.
3. **Ellisia.** Stamens included. Calyx destitute of appendages, enlarged in fruit.

* * Ovary with narrow parietal placentæ, in fruit projecting inward more or less.

4. **Phacelia.** Corolla-lobes imbricated in the bud. Calyx destitute of appendages.

**Tribe II. HYDROLEÆ.** Ovary and capsule 2-celled, the placentæ often projecting from the axis far into the cells. Albumen fleshy Leaves entire. Styles 2.

5. **Hydrolea.** Corolla between wheel-shaped and bell shaped.

### 1. HYDROPHÝLLUM, Tourn. Waterleaf.

Calyx 5-parted, sometimes with a small appendage in each sinus, early open in the bud. Corolla bell-shaped, 5-cleft; the lobes convolute in the bud; the tube furnished with 5 longitudinal linear appendages opposite the lobes, which cohere by their middle, while their edges are folded inward, forming a nectariferous groove. Stamens and style mostly exserted; filaments more or less bearded; anthers linear. Ovary bristly-hairy (as is usual in the family); the 2 fleshy placentæ expanded so as to line the cell and nearly fill the cavity, soon free from the walls except at the top and bottom, each bearing a pair of ovules on the inner face. Capsule ripening 1–4 seeds, spherical. — Perennials, with petioled ample leaves, and white or pale blue cymose-clustered flowers. (Name formed of ὕδωρ, *water*, and φύλλον, *leaf;* of no obvious application.)

* *Calyx with minute if any appendages; rootstocks creeping, scaly-toothed.*

1. **H. macrophýllum,** Nutt. *Rough-hairy; leaves oblong, pinnate and pinnatifid; the divisions* 9–13, *ovate, obtuse,* coarsely cut-toothed; root-leaves

1° long; *peduncle shorter than the petiole;* calyx-lobes lanceolate-pointed from a broad base, very hairy; flowers (6″ long) crowded in a globular cluster; anthers short-oblong. — Rich woods, Ohio to Va. and Ala., west to the Mississippi. July.

2. **H. Virgínicum,** L. *Smoothish* (1 – 2° high); *leaves pinnately divided; the divisions* 5 – 7, *ovate-lanceolate or oblong, pointed,* sharply cut-toothed, the lowest mostly 2-parted, the uppermost confluent; *peduncles longer than the petioles* of the upper leaves, forked; calyx-lobes narrowly linear, bristly-ciliate; flowers 3″ long; anthers oblong-linear. — Rich woods. June – Aug.

3. **H. Canadénse,** L. *Nearly smooth* (1° high); *leaves* (3 – 5′ broad) *palmately* 5 – 7-*lobed, rounded,* heart-shaped at base, unequally toothed, those from the root sometimes with 2 – 3 small and scattered lateral leaflets; *peduncles mostly shorter than the petioles,* forked, the nearly white flowers on very short pedicels; calyx-lobes linear-awl-shaped, nearly smooth, often with minute teeth in the sinuses. — Damp rich woods, N. Eng. to the mountains of Va., and west to the Mississippi. June – Aug. — Rootstocks thickened and very strongly toothed in 2 rows by the persistent bases of the stout petioles.

* * *Calyx with a small reflexed lobe in each sinus; stamens little exserted.*

4. **H. appendiculàtum,** Michx. Hairy; stem-leaves palmately 5-lobed, rounded, the lobes toothed and pointed, the lowest pinnately divided; cymes rather loosely flowered; filiform pedicels and calyx bristly-hairy. — Damp woods, Ont. to mountains of N. C., west to Minn., Iowa, and Mo. June, July.

## 2. NEMÓPHILA, Nutt.

Calyx 5-parted, with a reflexed appendage in each sinus, more or less enlarged in fruit. Corolla bell-shaped or almost wheel-shaped; the lobes convolute in the bud; the tube mostly with 10 small folds or scales inside. Stamens included; anthers ovoid or heart-shaped. Placentæ (bearing each 2 – 12 ovules), capsule and seeds as in Hydrophyllum. — Diffuse and fragile annuals, with opposite or partly alternate pinnatifid or lobed leaves, and one-flowered peduncles; the corolla white, blue, or marked with purple. (Name composed of *νέμος, a grove,* and *φιλέω, to love.*) Some handsome species are garden annuals.

1. **N. micrdcalyx,** Fisch. & Meyer. Small, roughish-pubescent; stems diffusely spreading (2 – 8′ long); leaves parted or deeply cleft into 3 – 5 roundish or wedge-obovate sparingly cut-lobed divisions, the upper leaves all alternate; peduncles opposite the leaves, shorter than the long petioles; flowers minute; corolla white, longer than the calyx; placentæ each 2-ovuled; capsule 1 – 2-seeded. — Moist woods, Va. to Fla., west to Ark. and Tex. April – June.

## 3. ELLÍSIA, L.

Calyx 5-parted, without appendages, enlarged and foliaceous in fruit. Corolla bell-shaped or cylindraceous, not longer than the calyx, 5-lobed above; the lobes imbricated or convolute in the bud, the tube with 5 minute appendages within. Stamens included. Placentæ (each 2-ovuled), fruit, and seeds much as in Hydrophyllum. — Delicate and branching annuals, with lobed or divided leaves, the lower opposite, and small whitish flowers. (Named for *John Ellis,* a distinguished naturalist, an English correspondent of Linnæus.)

1. **E. Nyctèlea,** L. Minutely or sparingly roughish-hairy, divergently branched (6 – 12′ high); leaves pinnately parted into 7 – 13 lanceolate or linear-oblong sparingly cut-toothed divisions; peduncles solitary in the forks or opposite the leaves, 1-flowered; calyx-lobes lanceolate, pointed, about the length of the cylindraceous (whitish) corolla (in fruit ovate-lanceolate, nearly ½′ long), capsule pendulous. (E. ambigua, *Nutt.;* merely a slender form.) — Shady damp places, N. J. to Va., west to Minn. and Mo. May – July.

## 4. PHACÈLIA, Juss.

Calyx 5-parted; the sinuses naked. Corolla open-bell-shaped, 5-lobed; the lobes imbricated in the bud. Filaments slender, often (with the 2-cleft style) exserted; anthers ovoid or oblong. Ovary with 2 narrow linear placentæ adherent to the walls, in fruit usually projecting inward more or less, the two often forming an imperfect partition in the ovoid 4 – many seeded capsule. (Ovules 2 – 30 on each placenta.) — Perennial or mostly annual herbs, with simple, lobed, or divided leaves, and often handsome (blue, purple, or white) flowers in scorpioid raceme-like cymes. (Name from *φάκελος, a fascicle.*)

§ 1. PHACELIA proper. *Seeds and ovules only* 4 (*two on each placenta*); *corolla campanulate, with narrow folds or appendages within, the lobes entire.*

1. **P. bipinnatífida,** Michx. Biennial; stem upright, hairy (1 - 2° high), leaves long-petioled, pinnately 3 – 5-divided, the divisions or leaflets ovate or oblong-ovate, acute, coarsely and often sparingly cut-lobed or pinnatifid; racemes elongated, loosely many-flowered, glandular-pubescent; pedicels about the length of the calyx, spreading or recurved. — Shaded banks, in rich soil, Ohio to Ill. and southward. May, June. — Corolla bright blue, 6″ broad, with 5 pairs of longitudinal ciliate folds, covering as many externally keeled deep grooves. Stamens bearded below and with the style exserted.

§ 2. COSMÁNTHUS. *Ovules and seeds as in* § 1; *corolla almost rotate, with fimbriate lobes, and no appendages within: filaments villous-bearded, rarely exserted; leaves pinnatifid, the upper clasping.*

2. **P. Púrshii,** Buckley. Sparsely hairy; stem erect or ascending, branched (8 – 12′ high); *lobes of the stem-leaves* 5 – 9, *oblong or lanceolate, acute; raceme many-flowered; calyx-lobes lance-linear; corolla light blue,* varying to white (about ½′ in diameter). — Moist wooded banks, W. Penn. to Minn., and southward. April – June.

3. **P. fimbriàta,** Michx. Slightly hairy, slender; stems spreading or ascending (5 – 8′ long), few-leaved; lowest leaves 3 – 5-divided into roundish leaflets; the upper 5 – 7-cleft or cut-toothed, the *lobes obtuse; raceme* 3 – 10-*flowered; calyx-lobes linear-oblong, obtuse,* becoming spatulate; *corolla white* (3 – 4″ broad). — Woods, high mountains of Va. to Ala. May.

§ 3. COSMANTHOÌDES. *Ovules and seeds* 2 – 8 *on each placenta; corolla rotate or campanulate, with entire lobes and no appendages.*

4. **P. parviflòra,** Pursh. Somewhat hairy, slender, diffusely spreading (3 – 8′ high); leaves pinnately cleft or the lower divided into 3 – 5 short lobes; racemes solitary, loosely 5 – 15-flowered, pedicels filiform, at length several times longer than the oblong calyx-lobes; corolla open-campanulate, bluish-

white (4 – 6″ broad); filaments hairy; capsule globular, 6 – 12-seeded, a half shorter than the calyx. — Shaded banks, Penn. and Ohio to Mo., south to S. C. and Tex. April – June.

Var. **hirsùta,** Gray. More hirsute and the stems less slender, apparently growing in more open dry soil; corolla larger, 5 – 7″ in diameter; seeds 4 – 8. — Prairies and barrens, S. W. Mo. to E. Tex.; also Va. and Ga.

5. **P. Covíllei,** Watson. Like the last; racemes 2 – 5-flowered; calyx-lobes linear, in fruit 3″ long or more; corolla tubular-campanulate with erect limb; filaments glabrous; capsule depressed-globose; seeds 4, large. — Larkspur Island in the Potomac, five miles above Washington. (*F. V. Coville.*)

§ 4. EÙTOCA. *Ovules and seeds numerous on each placenta; corolla rotate-campanulate, with* 10 *vertical lamellæ within.*

6. **P. Franklínii,** Gray. Soft-hairy; stem erect (6 – 15′ high), rather stout; leaves pinnately parted into many lanceolate or oblong-linear lobes, which are crowded and often cut-toothed or pinnatifid; racemes short, dense, crowded into an oblong spike; calyx-lobes linear; corolla blue. — Shores of L. Superior, thence north and westward.

### 5. HYDRÒLEA, L.

Calyx 5-parted. Corolla short-campanulate or almost wheel-shaped, 5-cleft. Filaments dilated at base. Styles 2, distinct. Capsule globular, 2-celled, with very large and fleshy many-seeded placentæ, thin-walled, 2 – 4-valved or bursting irregularly. Seeds minute, striate-ribbed.— Herbs or scarcely shrubby, growing in water or wet places (whence the name, from ὕδωρ, *water*), with entire leaves, often having spines in their axils, and clustered blue flowers.

1. **H. affìnis,** Gray. Glabrous throughout; stem ascending from a creeping base, armed with small axillary spines; leaves lanceolate, tapering to a very short petiole; flowers in small axillary leafy-bracted clusters; divisions of the calyx lance-ovate, equalling the corolla and the irregularly-bursting globose capsule. — Banks of streams, S. Ill. to Tex.

## ORDER 72. BORRAGINÀCEÆ. (BORAGE FAMILY.)

*Chiefly rough-hairy herbs, with alternate entire leaves, and symmetrical flowers with a* 5*-parted calyx, a regular* 5*-lobed corolla* (except in Echium), 5 *stamens inserted on its tube, a single style and a usually deeply* 4*-lobed ovary* (*as in* Labiatæ), *forming in fruit* 4 *seed-like* 1*-seeded nutlets, or separating into two* 2*-seeded or four* 1*-seeded nutlets.* — Albumen none. Cotyledons plano-convex; radicle pointing to the apex of the fruit. Stigmas 1 or 2. Calyx valvate, the corolla imbricated (in Myosotis convolute) in the bud. Flowers mostly on one side of the branches of a reduced cyme, imitating a spike or raceme, which is rolled up from the end, and straightens as the blossoms expand (circinate or scorpioid), often bractless. (A rather large family of innocent, mucilaginous, and slightly bitter plants; the roots of some species yielding a red dye.)

**Tribe I. HELIOTROPIEÆ.** Ovary not lobed; fruit separating into 2 - 4 nutlets.

1. **Heliotropium.** Corolla salver-form. Stamens included. Nutlets 1 - 2-celled.

**Tribe II. BORRAGINEÆ.** Ovary deeply 4-parted, forming as many separate 1-seeded nutlets in fruit; style rising from the centre between them.

* Corolla and stamens regular.

+- Nutlets armed, attached laterally; corolla short, closed by 5 scales.

2. **Cynoglossum.** Nutlets horizontally radiate, much produced downward, covered with barbed prickles.
3. **Echinospermum.** Nutlets erect or ascending, the margin or back armed with barbed prickles.

+- +- Nutlets not armed, attached more or less laterally.

4. **Krynitzkia.** Corolla short, white, with closed throat. Nutlets attached along the inner angle.
5. **Mertensia.** Corolla trumpet-shaped with open throat, usually blue. Nutlets fleshy, attached just above the base.

+- +- +- Nutlets unarmed, attached by the very base, ovoid, mostly smooth and shining.

++ Scar flat, small. Racemes leafy-bracteate, except in n. 6.

6. **Myosotis.** Corolla short salver-form, its lobes rounded, and throat crested.
7. **Lithospermum.** Corolla salver-form to funnel-form, its rounded lobes spreading; the throat either naked or with low crests.
8. **Onosmodium.** Corolla tubular, unappendaged, its erect lobes acute.

++ ++ Scar large and excavated.

9. **Symphytum.** Corolla oblong-tubular, enlarged above and closed by 5 scales.

* * Corolla irregular, limb and throat oblique and lobes unequal.

10. **Lycopsis.** Corolla-tube curved, closed with hispid scales. Stamens included.
11. **Echium.** Dilated throat of corolla unappendaged. Stamens unequal, exserted.

Asperùgo procúmbens, L., a European annual, well marked by its much enlarged membranaceous and veiny fructiferous calyx, has sparingly appeared in waste grounds about New York and Philadelphia, and at Pipestone, Minn.

## 1. HELIOTRÒPIUM, Tourn. Tournsole, Heliotrope.

Corolla salver-form or funnel-form, unappendaged, more or less plaited in the bud. Anthers nearly sessile. Style short; stigma conical or capitate. Fruit 2–4-lobed, separating into 2 indurated 2-celled and 2-seeded closed carpels, or more commonly into 4 one-seeded nutlets. — Herbs or low shrubby plants; leaves entire; fl. in summer, white (in our species). (The ancient name, from ἥλιος, *the sun*, and τροπή, *a turn*, with reference to its flowering at the summer solstice.)

§ 1. HELIOTROPIUM proper. *Fruit 4-lobed, separating into four 1-celled 1-seeded nutlets. Style short.*

* *Flowers in bractless one-sided scorpioid spikes.*

**H.** Europæum, L. Erect annual (6–18′ high), hoary-pubescent; leaves oval, long-petioled; lateral spikes single, the terminal in pairs; calyx spreading in fruit, hairy. — Waste places, southward; scarce. (Adv. from Eu.)

1. **H. Curassávicum,** L. Apparently annual, glabrous; stems ascending; leaves lance-linear or spatulate, thickish, pale, almost veinless; spikes in pairs. — Sandy seashore, Va.; saline soils, S. Ill., and south and westward.

* * *Inflorescence not at all scorpioid; flowers scattered.*

2. **H. tenéllum,** Torr. A span to a foot high, paniculately branched, slender, strigose-canescent; leaves narrowly linear, with revolute margins; flowers often bractless. — Open dry ground, Ky. to Mo. and Kan., south to Ala. and Tex.

§ 2. EÙPLOCA. *Fruit didymous, the 2 carpels each splitting into two 1-seeded nutlets; style elongated; flowers scattered, large.*

3. **H. convolvulàceum,** Gray. Low annual, strigose-hirsute and hoary, much branched; leaves lanceolate, or ovate or even linear, short-petioled; flowers opposite the leaves and terminal; corolla 6′′ broad, the strigose-hirsute tube about twice as long as the linear sepals. — Sandy plains, Neb. to W. Tex. A showy plant, with sweet-scented flowers.

§ 3. TIARÍDIUM. *Fruit 2-lobed, separating into two 2-celled 2-seeded carpels, with sometimes a pair of empty false cells; style very short; flowers in bractless scorpioid spikes.*

**H.** Índicum, L. Erect and hairy annual; leaves petioled, ovate or oval and somewhat heart-shaped; spikes single; fruit 2-cleft, mitre-shaped, with an empty false cell before each seed-bearing cell. (Heliophytum Indicum, *DC.*) — Waste places, along the great rivers, from S. Ind. to Mo., and southward. (Adv. from India.)

## 2. CYNOGLÓSSUM, Tourn. Hound's-Tongue.

Corolla funnel-form, the tube about equalling the 5-parted calyx, and throat closed with 5 obtuse scales; lobes rounded. Stamens included. Nutlets depressed or convex, oblique, fixed near the apex to the base of the style, roughened all over with short barbed or hooked prickles. — Coarse herbs, with a strong scent and petioled lower leaves; the mostly panicled (so-called) racemes naked above, usually bracted at base. Fl. all summer. (Name from *κύων, a dog*, and *γλῶσσα, tongue;* from the shape and texture of the leaves.)

**C.** officinàle, L. (Common Hound's-Tongue.) Biennial; *clothed with short soft hairs, leafy*, panicled above; upper leaves lanceolate, closely sessile by a rounded or slightly heart-shaped base; racemes nearly bractless; *corolla reddish-purple* (rarely white); nutlets flat on the broad upper face, somewhat margined. — Waste ground and pastures; a familiar and troublesome weed; the large nutlets adhering to the fleece of sheep, etc. (Nat. from Eu.)

1. **C. Virgínicum,** L. (Wild Comfrey.) Perennial; *roughish with spreading bristly hairs;* stem simple, *few-leaved* (2–3° high); stem-leaves lanceolate-oblong, clasping by a deep heart-shaped base; *racemes few and corymbed, raised on long naked peduncles,* bractless; *corolla pale blue;* nutlets strongly convex. — Open woods, Ont. and Sask. to Fla. and La.

## 3. ECHINOSPÉRMUM, Lehm. Stickseed.

Corolla salver-form, short, imbricated in the bud, the throat closed with 5 short scales. Stamens included. Nutlets erect, fixed laterally to the base of the style or central column, triangular or compressed, the back armed all over or with 1–3 marginal rows of prickles which are barbed at the apex, otherwise naked. — Rough-hairy and grayish herbs, with small blue to whitish flowers in racemes or spikes; ours annuals or biennials, flowering all summer. (Name compounded of *ἐχῖνος, a hedgehog*, and *σπέρμα, seed.*)

* *Racemes panicled, leafy-bracteate at base; slender pedicels recurved or deflexed in fruit; calyx-lobes short, at length reflexed; biennial, not hispid.*

1. **E. Virgínicum,** Lehm. (Beggar's Lice.) Stem 2–4° high; radical leaves round-ovate or cordate, slender-petioled; cauline (3–8′ long) ovate-

oblong to oblong-lanceolate, acuminate at both ends; loosely paniculate racemes divaricate; pedicel and flower each a line long, *nutlets of the globose fruit equally short-glochidiate over the whole back.* (Cynoglossum Morisoni, *DC.*) — Borders of woods and thickets, N. Eng. to Minn., south to Va. and La.

2. **E. defléxum,** Lehm., var **Americànum,** Gray Diffusely branched, about 1° high, leaves oblong to lanceolate, racemes lax, loosely paniculate; flowers small; *nutlets of the globular-pyramidal fruit only marginally glochidiate.* — Iowa, Minn., and northward.

3. **E. floribúndum,** Lehm Rather strict, 2° high or more; leaves oblong- to linear-lanceolate, the lowest tapering into margined petioles; racemes numerous, commonly geminate and in fruit rather strict; corolla larger (blue, sometimes white), 2–3‴ in diameter; nutlets scabrous and margined with a close row of flat subulate prickles. — Minn and Sask., and westward.

* * *Racemes leafy-bracteate. stout pedicels not deflexed; calyx becoming foliaceous; leaves linear, lanceolate, or the lower spatulate · hispid annuals.*

**E.** Láppula, Lehm. Erect, 1–2° high, nutlets rough-granulate or tuberculate on the back, the margins with a double row of slender distinct prickles, or these irregular over most of the back — Waste and cultivated grounds, from Canada to the Middle Atlantic States. (Nat. from Eu.)

4. **E. Redówskii,** Lehm., var **occidentàle,** Watson. Erect, 1–2° high, at length diffuse; nutlets irregularly and minutely sharp-tuberculate, the margins armed with a single row of stout flattened prickles sometimes confluent at base. — Minn. to Tex., and westward.

## 4. KRYNÍTZKIA, Fisch. & Meyer.

Calyx 5-parted or deeply cleft, erect or little spreading in fruit. Corolla short, usually with more or less fornicate throat. Nutlets erect and straight, unarmed, attached to the axis either at inner edge of base or ventrally from the base upward. — Ours are very hispid annuals or biennials, with small white flowers in scorpioid spikes. A large western genus. (Dedicated to *Prof. J. Krynitzki*, of Cracow.)

1. **K. crassisépala,** Gray. Annual, diffusely much branched, a span high, very rough-hispid; *leaves oblanceolate and linear-spatulate;* flowers very small, short-pedicelled, mostly bracteate; *lobes of the persistent calyx closed over the fruit, the midrib below becoming much thickened* and indurated; nutlets ovate, acute, *dissimilar,* 3 of them muricate-granulate and 1 larger and smooth, *attached from the base to the middle.* — Plains, Sask. to Kan., Tex. and N. Mex.

## 5. MERTÉNSIA, Roth. LUNGWORT.

Corolla trumpet-shaped or bell-funnel-shaped, longer than the deeply 5-cleft or 5-parted calyx, naked, or with 5 small glandular folds or appendages in the open throat. Anthers oblong or arrow-shaped. Style long and thread-form. Nutlets ovoid, fleshy when fresh, smooth or wrinkled, obliquely attached next the base by a prominent internal angle, the scar small. — Smooth or soft-hairy perennial herbs, with pale and entire leaves, and handsome purplish-blue (rarely white) flowers, in loose and short panicled or corymbed raceme-like clusters, only the lower one leafy-bracted; pedicels slender. (Named for *Prof. Francis Charles Mertens*, a German botanist.)

* *Corolla trumpet-shaped, with spreading nearly entire limb and naked throat; filaments slender, exserted; hypogynous disk 2-lobed.*

1. **M. Virgínica,** DC. (VIRGINIAN COWSLIP. LUNGWORT. BLUE BELLS.) Very smooth, pale, erect (1 – 2° high); leaves obovate, veiny, those at the root (4 – 6′ long) petioled; corolla trumpet-shaped, 1′ long, many times exceeding the calyx, rich purple-blue, rarely white; nutlets dull and roughish. — Alluvial banks, N. Y. to Minn., S. C., and Ark. May. Cultivated for ornament.

* * *Corolla with conspicuously 5-lobed limb, and crested throat.*

+ *Filaments broad and short; nutlets dull, wrinkled or roughish when dry.*

2 **M. paniculàta,** Don. Roughish and more or less hairy, erect (1 – 2° high), loosely branched, *leaves ovate and ovate-lanceolate, taper-pointed, ribbed, thin;* corolla (6″ long) somewhat funnel-form, 3 – 4 times the length of the lance-linear acute divisions of the calyx, filaments broader and shorter than the anthers. — Shore of L. Superior and north and westward. July and Aug

3. **M. lanceolàta,** DC. Glabrous or hirsute, pale, 1° high or less, simple or branched, *leaves spatulate-oblong to lanceolate-linear, smaller* (1 – 2′ *long*), *nearly veinless, obtuse or acute;* corolla-tube somewhat longer than the lanceolate calyx-lobes; *filaments generally longer than the anthers.* — Dak. to N. Mex. and westward.

+ + *Filaments longer and narrower than the anthers; nutlets shining, utricular.*

4. **M. marítima,** Don. (SEA LUNGWORT.) Spreading or decumbent, smooth, glaucous; leaves fleshy, ovate or obovate or spatulate, the upper surface becoming papillose; corolla white, bell-funnel-form (3″ long), twice the length of the calyx. — Sea-coast, on rocks and sand, Cape Cod to Maine and northward; scarce. June – Aug.

## 6. MYOSÒTIS, Dill. SCORPION-GRASS. FORGET-ME-NOT.

Corolla salver-form, the tube about the length of the 5-toothed or 5-cleft calyx, the throat with 5 small and blunt arching appendages opposite the rounded lobes; the latter convolute in the bud! Stamens included, on very short filaments. Nutlets smooth, compressed, fixed at the base; the scar minute. — Low and mostly soft-hairy herbs, with entire leaves, those of the stem sessile, and with small flowers in naked racemes, which are entirely bractless, or occasionally with one or two small leaves next the base, prolonged and straightened in fruit. Flowering through the season. (Name composed of *μύς, mouse,* and *οὖς, ὠτός, ear,* in allusion to the aspect of the short and soft leaves in some species; one popular name is MOUSE-EAR.)

* *Calyx open in fruit, its hairs appressed, none of them hooked or glandular.*

**M.** PALÚSTRIS, Withering. (TRUE FORGET-ME-NOT.) Perennial; stems ascending from an oblique creeping base (9 – 20′ high), loosely branched, smoothish; leaves rough-pubescent, oblong-lanceolate or linear-oblong; calyx-lobes much shorter than its tube; limb of corolla 3 or 4 lines broad, sky-blue with a yellow eye. — In wet ground, probably only escaped from cultivation. (Nat. from Eu.)

1. **M. láxa,** Lehm. Perennial from filiform subterranean shoots; stems very slender, decumbent; pubescence all appressed; leaves lanceolate-oblong

or somewhat spatulate; calyx-lobes as long as its tube; limb of corolla 2 or 3″ broad, paler blue. (M. palustris, var. laxa, *Gray.*) — In water and wet ground, Newf. to N. Y. (Eu.)

* * *Calyx closing or the lobes erect in fruit, clothed with spreading hairs, some minutely hooked or gland-tipped; corolla small; annual or biennial.*

2. **M. arvénsis,** Hoffm. Hirsute with spreading hairs, erect or ascending (6 – 15′ high); leaves oblong-lanceolate, acutish; *racemes naked at the base and stalked;* corolla blue, rarely white; *pedicels spreading in fruit and longer than the* 5-*cleft equal calyx.* — Fields, etc.; not very common. (Eu.)

3. **M. vérna,** Nutt. Bristly-hirsute, branched from the base, erect (4 – 12′ high); *leaves obtuse,* linear-oblong, or the lower spatulate-oblong; *racemes leafy at the base;* corolla very small, white, with a short limb; *pedicels in fruit erect and appressed* at the base, usually abruptly bent outward near the apex, *rather shorter than the deeply* 5-*cleft unequal* (somewhat 2-lipped) *very hispid calyx.* — Dry ground, rather common. May – July.

**M.** VERSÍCOLOR, Pers. More slender than the last, simple at base; racemes loose, mostly naked at base; *flowers almost sessile; corolla pale yellow changing to blue or violet; calyx deeply and equally* 5-*cleft.* — Fields, Del. (Nat. from Eu.)

## 7. LITHOSPÉRMUM, Tourn. GROMWELL. PUCCOON.

Corolla funnel-form, or sometimes salver-shaped; the open throat naked, or with a more or less evident transverse fold or scale-like appendage opposite each lobe; the spreading limb 5-cleft, its lobes rounded. Anthers oblong, almost sessile, included. Nutlets ovate, smooth or roughened, mostly bony or stony, fixed by the base; scar nearly flat. — Herbs, with thickish and commonly red roots and sessile leaves; flowers solitary and as if axillary, or spiked and leafy-bracted, sometimes dimorphous as to insertion of stamens and length of style. (Name formed of λίθος, *stone,* and σπέρμα, *seed,* from the hard nutlets.)

§ 1. *Nutlets tubercled or rough-wrinkled and pitted, gray and dull; throat of the (nearly white) corolla destitute of any evident folds or appendages.*

**L.** ARVÉNSE, L. (CORN GROMWELL.) Minutely rough-hoary, annual or biennial; stems erect (6 – 12′ high); leaves lanceolate or linear, veinless; corolla scarcely longer than the calyx. — Sandy banks and roadsides. May – Aug. (Nat. from Eu.)

§ 2. *Nutlets smooth and shining, white like ivory; corolla greenish-white or pale-yellow, small, with* 5 *distinct pubescent scales in the throat; perennial.*

**L.** OFFICINÀLE, L. (COMMON GROMWELL.) Much branched above, erect (1 – 2° high); *leaves thinnish, broadly lanceolate, acute,* with a few distinct veins, rough above, soft-pubescent beneath; *corolla exceeding the calyx.* — Roadsides, N. Eng. to Minn. (Nat. from Eu.)

1. **L. latifòlium,** Michx. Stem loosely branched, erect (2 – 3° high), rough; *leaves ovate and ovate-lanceolate, mostly taper-pointed* (even the floral ones 2 – 4′ long), *ribbed-veined,* roughish above, finely soft-pubescent beneath, the root-leaves large and rounded; *corolla shorter than the calyx.* — Open ground and borders of woods, W. New York to Minn., south to Va. and Ark.

§ 3. BÁTSCHIA. *Nutlets white, smooth and shining; corolla large, salver-form or nearly so, deep orange-yellow, somewhat pubescent, the tube much* *exceeding the calyx, and the throat appendaged.* (*Roots perennial, long and deep, yielding a red dye.*)

* *Corolla-tube one half to twice longer than the calyx, not much longer than the ample limb, the lobes entire; appendages little if at all projecting.*

2. **L. hírtum,** Lehm. *Hispid* with bristly hairs (1–2° high); stem-leaves lanceolate or linear, those of the flowering branches ovate-oblong, bristly-ciliate; *corolla woolly-bearded at the base inside* (limb 8–12″ broad); *flowers distinctly peduncled,* crowded, showy; *fruiting calyx* (½′ long) 3–4 times longer than the nutlets. — Pine barrens, etc., N. Y. to Minn., south and westward. April–June.

3. **L. canéscens,** Lehm. (Puccoon of the Indians.) *Softly hairy* and more or less *hoary* (6–15′ high); *leaves obtuse,* linear-oblong, or the upper ovate-oblong, more or less *downy beneath* and roughish with close appressed hairs above; *flowers sessile; corolla naked at the base within; fruiting calyx* (3″ long) *barely twice the length of the nutlets.* — Plains and open woods, in sandy soil, Ont. to Va., Ala., and westward. May.

* * *Corolla-tube in well-developed flowers 2–4 times the length of the calyx and of its erose-toothed lobes, and the appendages conspicuous and arching; later flowers small, cleistogenous.*

4. **L. angustifòlium,** Michx. Erect or diffusely branched from the base, 6–18′ high, minutely rough-strigose and hoary; leaves linear; flowers pedicelled, leafy-bracted, of two sorts; the earlier large and showy (corolla-tube 8–18″ long), the later and those of more diffusely branching plants, with inconspicuous or small and pale corollas, without crests, and the pedicels commonly recurved in fruit; nutlets usually punctate. (L. longiflorum, *Spreng.*; the long-flowered form.) — Dry and sterile or sandy soil, Ind. and Mich. to Dak. and Tex., and westward.

### 8. ONOSMÒDIUM, Michx. False Gromwell.

Calyx 5-parted; the divisions linear and erect. Corolla tubular, or tubular-funnel-form, not crested (the sinuses minutely hooded-inflexed), the 5 acute lobes converging or barely spreading. Anthers oblong-linear or arrow-shaped, mucronate, inserted in the throat. Style thread-form, much exserted. Nutlets bony, ovoid, smooth, erect, fixed by the base; the scar minute, not hollowed out. — Chiefly perennial herbs, coarse and hispid, with oblong and sessile ribbed-veined leaves, and white, greenish, or yellowish flowers, in at length elongated and erect leafy raceme-like clusters; in summer. — Our species belong to true Onosmodium, with smooth included anthers on very short filaments; the corolla rarely twice the length of the calyx. (Named from the likeness to the genus *Onosma,* which name means *ass-smell.*)

1. **O. Virginiànum,** DC. *Clothed all over with harsh and rigid appressed short bristles;* stems rather slender (1–2° high); *leaves narrowly oblong,* or oblong-lanceolate (1–2½′ long), the lower narrowed at base; *lobes of the narrow corolla lance-awl-shaped,* sparingly bearded outside with long bristles. — Banks and hillsides, N. Eng. to Fla., Mo., and La.

2. **O. Caroliniànum,** DC. *Shaggy all over with long and spreading bristly hairs;* stem stout, upright (2–4° high); *leaves ovate-lanceolate or*

*oblong-lanceolate*, acute; lobes of the rather broad corolla *ovate-triangular or triangular-lanceolate, thickly hirsute outside.* — Alluvial grounds, W. New York to Minn., south to Ga. and Tex.

Var. **mólle**, Gray. *Pubescence shorter and less spreading or appressed*, 1–2° high; leaves mostly smaller (2′ long), when young softly strigose-canescent beneath. (O. molle, *Michx.*) — Ill. to Minn., Tex., and westward.

### 9. SÝMPHYTUM, Tourn. Comfrey.

Corolla oblong-tubular, inflated above, 5-toothed, the short teeth spreading; the throat closed with 5 converging linear-awl-shaped scales. Stamens included; anthers elongated. Style thread-form. Nutlets smooth, ovate, erect, fixed by the large hollowed base, which is finely toothed on its margin. — Coarse perennial herbs, with thickened bitterish mucilaginous roots; the nodding raceme-like clusters either single or in pairs. (Ancient Greek name from συμφεῖν, *to grow together*, probably for its reputed healing virtues.)

**S. officinàle**, L. (Common Comfrey.) Hairy, branched, winged above by the decurrent leaves; the lower leaves ovate-lanceolate, tapering into a petiole, the upper narrower; corolla yellowish-white, rarely purplish. — Moist places; escaped from gardens. June. (Adv. from Eu.)

### 10. LYCÓPSIS, L. Bugloss.

Corolla funnel-shaped, with curved tube and slightly unequal limb; the throat closed with 5 convex obtuse bristly scales opposite the lobes. Stamens and style included. Nutlets rough-wrinkled, erect, fixed by a hollowed-out base. — Annuals. (Name from λύκος, *a wolf*, and ὄψις, *face*.)

**L. arvénsis**, L. (Small Bugloss.) Very rough-bristly (1° high); leaves lanceolate; flowers in leafy raceme-like clusters; calyx as long as the tube of the small blue corolla. — Dry or sandy fields, New Eng. to Va.; scarce. (Adv. from Eu.)

### 11. ÉCHIUM, Tourn. Viper's Bugloss.

Corolla with a cylindraceous or funnel-form tube, and a more or less unequal spreading 5-lobed border; lobes rounded, the expanded throat naked. Stamens mostly exserted, unequal. Style thread-form. Nutlets roughened or wrinkled, fixed by a flat base. (A name of Dioscorides, from ἔχις, *a viper*.)

**E. vulgàre**, L. (Blue-weed.) Rough-bristly biennial; stem erect (2° high), mostly simple; stem-leaves linear-lanceolate, sessile; flowers showy, in short lateral clusters, disposed in a long and narrow thyrsus; corolla reddish-purple changing to brilliant blue (rarely pale). — Roadsides and meadows of the Middle Atlantic States. June. (Nat. from Eu.)

## Order 73. CONVOLVULÀCEÆ. (Convolvulus Family.)

*Chiefly twining or trailing herbs, often with some milky juice, with alternate leaves (or scales) and regular 5-androus flowers; a calyx of 5 imbricated sepals; a 5-plaited or 5-lobed corolla convolute or twisted in the bud (imbricate in* n. 6); *a 2-celled (rarely 3-celled) ovary (or in one tribe* 2 *separate pistils), with a pair of erect ovules in each cell, the cells sometimes doubled by a false partition between the seeds, so becoming* 4*-celled; the embryo large, curved or coiled in mucilaginous albumen.* — Fruit a globular 2–6-seeded capsule. Flowers mostly showy, on axillary peduncles; pedicels articulated, often 2-bracted. (Many are cultivated for ornament, and one, the Sweet Potato, for its edible farinaceous roots; those of several species are cathartic; e. g. Jalap.)

**Tribe I. DICHONDREÆ.** Carpels 2 or 4, distinct or nearly so; styles 2, basilar. Creeping herbs.

1. **Dichondra.** Corolla deeply 5-cleft. Pistils 2, one-seeded.

**Tribe II. CONVOLVULEÆ.** Ovary entire. Leafy plants, mostly twiners

2. **Ipomœa.** Style undivided, with stigma capitate or 2-3-globose.
3. **Convolvulus.** Style undivided or 2-cleft only at apex; stigmas 2, linear-filiform to subulate or ovate.
4. **Breweria.** Style 2-cleft or 2-parted; the divisions simple; stigmas capitate.
5. **Evolvulus.** Styles 2, each 2-cleft; stigmas linear-filiform. Not twining.

**Tribe III. CUSCUTEÆ.** Ovary entire. Leafless parasitic twining herbs, never green. Embryo filiform, coiled, without cotyledons.

6. **Cuscuta.** The only genus of the group.

## 1. DICHÓNDRA, Forst.

Calyx 5-parted. Corolla broadly bell-shaped, 5-cleft. Stamens included. Styles, ovaries, and utricular 1-2-seeded capsules 2, distinct. Stigmas thick. — Small and creeping perennial herbs, soft-pubescent, with kidney-shaped entire leaves, and axillary 1-flowered bractless peduncles. Corolla small, yellowish or white. (Name from δίς, *double*, and χόνδρος, *a grain*; from the fruit.)

1. **D. rèpens,** Forst. Leaves round-kidney-shaped, pubescent, green both sides; corolla not exceeding the calyx (1-1½″ long). — Wet ground, Va. to Tex., near the coast.

## 2. IPOMŒA, L. MORNING GLORY.

Calyx not bracteate at base, but the outer sepals commonly larger. Corolla salver-form or funnel-form to nearly campanulate; the limb entire or slightly lobed. Style undivided, terminated by a single capitate or 2-3-globose stigma. Capsule globular, 4-6 (by abortion fewer)-seeded, 2-4-valved. (Name, according to Linnæus, from ἴψ, *a Bindweed*, and ὅμοιος, *like*; but ἴψ is *a worm*.)

§ 1. QUÁMOCLIT. *Corolla salver-form, or with somewhat funnel-form but narrow tube; stamens and style exserted; flowers red. Annual twiners.*

**I.** QUÁMOCLIT, L. (CYPRESS-VINE.) Leaves pinnately parted into linear-thread-shaped delicate parallel lobes; peduncles 1-flowered; corolla narrow, scarlet-red, or sometimes white. (Quamoclit vulgaris, *Choisy*.) — Sparingly spontaneous southward. (Trop. Amer., etc.)

**I.** COCCÍNEA, L. Leaves heart-shaped, acuminate, entire or angled; sepals awn-pointed; corolla light scarlet (1′ long). (Quamoclit coccinea, *Moench*.) — River-banks, etc., Ohio to Ill., Va., and southward. (Probably indigenous in N. Mex. and Arizona.)

§ 2. IPOMŒA proper. *Corolla funnel-form or nearly campanulate, contorted in the bud; stamens and style not exserted.*

* (MORNING GLORY.) *Lobes of stigma and cells* 3; *sepals long and narrow, attenuate upward, mostly hirsute below, corolla purple, blue, and white.*

**I.** HEDERÀCEA, Jacq. Stems retrorsely hairy, *leaves heart-shaped*, 3-*lobed*, the lobes acute or acuminate; peduncles short, or rather long, 1-3-flowered; calyx densely hairy below; corolla white and purple or pale blue (1-1½′ long). (I. Nil. of Manual, not *Roth*.) — Waste and cultivated ground, Penn. to Fla., and La. (Trop. Amer.)

**I. purpùrea**, Lam. (Common Morning-Glory.) Annual; stems retrorsely hairy; *leaves heart-shaped, acuminate, entire*; peduncles long, umbellately 3–5-flowered; calyx bristly-hairy below; corolla funnel-form (2′ long), purple, varying to white. — Escaped in cultivated grounds. (Trop. Amer.)

* * *Stigma 2-lobed or entire; cells 2, each 2-seeded; sepals broader, imbricated.*

+ *Leaves cordate, acuminate.*

1. **I. panduràta**, Meyer. (Wild Potato-vine. Man-of-the-Earth.) Perennial, smooth or nearly so when old, trailing or sometimes twining; leaves occasionally contracted at the sides so as to be fiddle-shaped; *peduncles longer than the petioles*, 1–5-flowered; *sepals smooth, ovate-oblong, very obtuse*; corolla open-funnel-form (3′ long), white with purple in the tube. — Dry ground, Conn. to Mich., south to Fla. and Tex. June–Aug. Stems long and stout, from a huge root, which often weighs 10–20 pounds.

2. **I. lacunòsa**, L. Annual; rather smooth; stem twining and creeping, slender; leaves entire or angled-lobed; *peduncles short*, 1–3-flowered; *sepals lance-oblong, pointed, bristly-ciliate* or hairy, half the length of the sharply 5-lobed (white, ½–⅓′ long) corolla. — River-banks and low grounds, Penn. to Ill., south to S. C. and Tex.

+ + *Leaves linear; not twining.*

3. **I. leptophýlla**, Torr. Perennial, very glabrous; stems erect or ascending (2–4° high), with slender recurving branches, from an immense root (weighing 10–100 pounds); leaves 2–4′ long, 2–3″ wide, short-petioled, acute; peduncles short, 1–2-flowered; sepals broadly ovate, very obtuse, outer ones shorter; corolla pink-purple, funnel-form, about 3′ long. — Plains of Neb. to central Kan., Tex., and westward.

## 3. CONVÓLVULUS, Tourn. Bindweed.

Corolla funnel-form to campanulate. Stamens included. Style undivided or 2-cleft only at the apex; stigmas 2, linear-filiform to subulate or ovate. Capsule globose, 2-celled, or imperfectly 4-celled by spurious partitions between the 2 seeds, or by abortion 1-celled, mostly 2–4-valved. — Herbs or somewhat shrubby plants, either twining, erect, or prostrate. (Name from *convolvo*, to entwine.)

§ 1. CALYSTÈGIA. *Stigmas oval to oblong; calyx enclosed in 2 broad leafy bracts.*

1. **C. spithamæus**, L. *Downy; stem low and mostly simple, upright or ascending* (6–12′ long); leaves oblong, with or without a heart-shaped or auricled base; corolla white (2′ long); stigmas oval. (Calystegia spithamæa, *Pursh.*) — Dry and sandy or rocky soil; not rare.

2. **C. sèpium**, L. (Hedge Bindweed.) Glabrous, or more or less pubescent; stem *twining or sometimes trailing extensively*; leaves triangular-halberd-shaped or arrow-shaped, acute or pointed, the basal lobes obliquely truncate and often somewhat toothed or sinuate-lobed; peduncles 4-angled; bracts commonly acute; corolla white or tinged with rose-color (1½–2′ long). (Calystegia sepium, *R. Br.*) — Moist alluvial soil, or along streams; N. Atlantic States and westward. (Eu., etc.)

Var. **Americànus**, Sims. Glabrous; corolla pink or rose-purple; bracts obtuse. (C. sepium of Am. authors mainly.) — Common, across the continent.

Var. **rèpens,** Gray. More or less pubescent; sterile and sometimes flowering stems extensively prostrate; leaves more narrowly sagittate or cordate, the basal lobes commonly obtuse or rounded and entire; corolla from almost white to rose-color; bracts very obtuse or acute. (Calystegia sepium, var. pubescens, *Gray.*) — Common.

§ 2. *Stigmas filiform; no bracts at or near the base of the calyx.*

**C.** ARVÉNSIS, L. (BINDWEED.) Perennial; stem procumbent or twining, and low; leaves ovate-oblong, arrow-shaped, with the lobes at the base acute; peduncles mostly 1-flowered; bracts minute, remote; corolla (9″ long) white or tinged with reddish. — Old fields, N. Atlantic States. (Eu.)

## 4. BREWÈRIA, R. Br.

Styles 2, or rarely 3, simple and distinct, or else united into one below; stigmas depressed-capitate. Otherwise as Convolvulus and Evolvulus. — Perennial prostrate or diffusely spreading herbs; flowers small; in summer; corolla more or less hairy or silky outside. (Named for *Samuel Brewer*, an English botanist or amateur of the 18th century.)

1. **B. humistràta,** Gray. *Sparsely hairy* or nearly smooth; leaves varying from oblong with a somewhat heart-shaped base to linear, mucronate or emarginate; peduncles 1–7-flowered; bracts shorter than the pedicels; *sepals pointed, glabrous* or nearly so; *corolla white; filaments hairy; styles united at base.* (Bonamia humistrata, *Gray.*) — Dry pine barrens, Va. to La.

2. **B. aquática,** Gray. *Minutely soft downy* and somewhat hoary; peduncles 1–3-flowered; *sepals silky; corolla pink or purple; filaments smooth; styles almost distinct;* otherwise nearly as n. 1. (Bonamia aquatica, *Gray.*) — Wet pine barrens and margins of ponds, N. C. to Tex., extending into Mo.

3. **B. Pickeríngii,** Gray. Soft-pubescent or smoothish; *leaves very narrowly linear* or the lowest linear-spatulate, tapering to the base, nearly sessile; peduncles 1–3-flowered; *bracts resembling the leaves,* mostly exceeding the flowers; *sepals hairy; filaments,* (scarcely hairy) *and styles* (*united far above the middle*) *exserted from the open white corolla.* (Bonamia Pickeringii, *Gray.*) — Dry pine barrens and prairies, N. J. and southward; also W. Ill.

## 5. EVÓLVULUS, L.

Calyx of 5 sepals, naked at base. Corolla open funnel-form or almost rotate. Styles 2, each 2-cleft; stigmas obtuse. Capsule 2-celled; the cells 2-seeded. — Low and small herbs or suffrutescent plants, mostly diffuse, never twining (hence the name, from *evolvo,* to unroll, in contrast with Convolvulus).

1. **E. argénteus,** Pursh. Many-stemmed from a somewhat woody base, dwarf, silky-villous all over; leaves crowded, broadly lanceolate, sessile, or the lower oblong-spatulate and short-petioled, about ½′ long; flowers almost sessile in the axils; corolla purple, 3″ broad. — Sterile plains and prairies, Dak. and Neb. to Mo. and Tex.

## 6. CÚSCUTA, Tourn. DODDER.

Calyx 5- (rarely 4-) cleft, or of 5 sepals. Corolla globular-urn-shaped, bell-shaped, or short-tubular, the spreading border 5- (rarely 4-) cleft, imbricate. Stamens with a scale-like often fringed appendage at base. Ovary 2-celled, 4-ovuled; styles distinct, or rarely united. Capsule mostly 4-seeded. Embryo thread-shaped, spirally coiled in the rather fleshy albumen, destitute of cotyledons, sometimes with a few alternate scales (belonging to the plumule); germination occurring in the soil. — Leafless annual herbs, with thread-like yellowish or reddish stems, bearing a few minute scales in place of leaves; on rising from the ground becoming entirely parasitic on the bark of herbs and shrubs on which they twine, and to which they adhere by means of suckers developed on the surface in contact. Flowers small, cymose-clustered, mostly white; usually produced late in summer and in autumn. (Name supposed to be of Arabic derivation.)

§ 1. *Stigmas elongated; capsule circumscissile.*

**C.** Epílinum, Weihe. (Flax Dodder.) Stems very slender, low; flowers globular, sessile in dense scattered heads; corolla 5-parted, short-cylindrical, scarcely exceeding the broadly ovate acute divisions of the calyx, persistent around the capsule; stamens included; scales short, broad, crenulate, shorter than the globose ovary. — Flax-fields; in Europe very injurious; sparingly introduced with flax-seed into the Northern States. June.

**C.** Epíthymum, Murr. Stems very slender; flowers capitate; corolla-lobes spreading, the cylindrical tube longer than the suberect acute sepals; scales large, contiguous, toothed; stamens exserted. — Occasionally found in clover-fields. (Int. from Eu.)

§ 2. *Stigmas capitate; capsule indehiscent.*

* *Calyx gamosepalous; ovary and capsule depressed-globose.*

+ *Flowers in dense or globular clusters; corolla with short and wide tube, persistent at the base of the capsule; styles mostly shorter than the ovary.*

1. **C. chlorocárpa,** Engelm. *Stems coarse, orange-colored:* flowers white (1 – 1¼″ long); *lobes of calyx and corolla* (mostly 4) *acute*, often longer than the tube; *scales small, 2-cleft*, often reduced to a few teeth; the thin capsule pale greenish-yellow. — Wet places, from Wisc. and Minn. to Ark.; also in Penn. and Del., often on Polygonum.

2. **C. arvénsis,** Beyrich. *Stems pale and slender*, low; *flowers smaller* (hardly 1″ long); *calyx-lobes* (5) *obtuse*, mostly very broad; those of the corolla acuminate, longer than the tube, with inflexed points; *scales large, deeply fringed.* — Rather dry soil on various low plants, N. Y. to Fla., west to the Pacific. Very variable.

+ + *Flowers in panicled often compound cymes; styles slender, mostly longer than the ovary; corolla withering on the summit of the large capsule.*

3. **C. tenuiflòra,** Engelm. Stems coarse and yellow, usually rather high-climbing; flowers (1″ long or less) on short thick pedicels, often 4-merous; lobes of calyx and corolla oblong, obtuse, the latter mostly shorter than the slender deeply campanulate tube; scales shorter than the tube, fringed. — On tall herbs and shrubs in wet places, Penn. to Minn., and south to Tex.

* * *Calyx gamosepalous; ovary and capsule pointed, the latter enveloped or capped by the marcescent corolla; flowers in loose panicled cymes.*

+ *Acute tips of the corolla-lobes inflexed.*

4. **C. decòra,** Engelm. Stems coarse; flowers fleshy and more or less papillose; calyx-lobes triangular, acute; those of the broadly campanulate

corolla ovate-lanceolate, minutely crenulate, *spreading; scales large, deeply fringed; capsule enveloped by remains of corolla.* (C. indecora, *Choisy.*) — Var. PULCHÉRRIMA, Engelm. The larger form, with coarser stems, and conspicuous flowers 1½ - 2½″ long and wide; anthers and stigmas yellow or deep purple. — Wet prairies, on herbs and low shrubs (principally Leguminosæ and Compositæ), from Ill. to Fla. and Tex., and westward.

5. **C. infléxa,** Engelm. Similar to the preceding; flowers of the same structure, but *smaller* (only 1″ long), generally 4-merous; corolla deeper, *with erect lobes, finally capping the capsule; scales reduced to a few teeth.* — Open woods and dry prairies, on shrubs (hazels, etc.) or coarse herbs, southern N. Eng. to Neb. and Ark.

+- +- *Corolla-lobes obtuse, spreading.*

6. **C. Gronòvii,** Willd. Stems coarse, often climbing high; corolla-lobes mostly shorter than the deeply campanulate tube; scales copiously fringed; *capsule globose, umbonate.* — Wet shady places, Canada to Minn., south to Fla. and Tex. The commonest of our species. Flowers very variable in size and compactness of clusters. — Var. LATIFLÒRA, Engelm., is a form with flowers of more delicate texture, and shorter tube and longer lobes to the corolla. Common northward.

7. **C. rostràta,** Shuttleworth. Similar to the preceding; flowers larger (2 - 3″ long), more delicate and whiter; lobes of corolla and calyx shorter than its tube; slender styles longer; *ovary bottle-shaped; capsule long-pointed.* — Shady valleys in the Alleghanies, from Md. and Va., southward; on tall herbs, rarely shrubs.

* * * *Sepals 5, distinct, surrounded by 2 or more similar bracts; styles capillary; scales large, deeply fringed; capsule capped by the marcescent corolla.*

8. **C. cuspidàta,** Engelm. Stems slender; flowers (1½ - 2¼″ long) thin, *on bracteolate pedicels in loose panicles;* the ovate-orbicular bracts and sepals and the oblong corolla-lobes cuspidate or mucronate, rarely obtuse, shorter than the cylindrical tube; styles many times longer than the ovary, at length exserted. — Wet or dry prairies, on Ambrosia, Iva, some Leguminosæ, etc., Neb. to Tex., occasionally down the Missouri as far as St. Louis.

9. **C. compácta,** Juss. Stems coarse; *flowers closely sessile in densely compact clusters; bracts* (3 - 5) *and sepals orbicular, concave, slightly crenate, appressed,* nearly equalling or much shorter than the cylindrical tube of the corolla; stamens shorter than the oblong obtuse spreading lobes of the latter. — Along the west side of the Alleghanies from Ont. to Ala., west to Mo. and Tex. In damp woods, almost always on shrubs.

10. **C. glomeràta,** Choisy. Flowers *very densely clustered,* forming knotty masses closely encircling the stem of the foster plant, much imbricated with scarious oblong *bracts, their tips recurved-spreading; sepals nearly similar,* shorter than the oblong-cylindrical tube of the corolla; stamens nearly as long as the oblong-lanceolate obtuse spreading or reflexed corolla-lobes; style several times longer than the ovary. — Wet prairies, Ohio to Minn., Kan., and Tex., mostly on tall Compositæ. The rope-like twists (½ - ¾′ thick), of white flowers with golden yellow anthers imbedded in a mass of curly bracts, have a singular appearance.

## ORDER 74. SOLANÀCEÆ. (NIGHTSHADE FAMILY.)

*Herbs (or rarely shrubs), with colorless juice and alternate leaves, regular 5-merous and 5-androus flowers, on bractless pedicels; the corolla imbricate or valvate in the bud, and mostly plaited; the fruit a 2-celled (rarely 3–5-celled) many-seeded capsule or berry.* — Seeds campylotropous or amphitropous. Embryo mostly slender and curved in fleshy albumen. Calyx usually persistent. Stamens mostly equal, inserted on the corolla. Style and stigma single. Placentæ in the axis, often projecting far into the cells. (Foliage rank-scented, and with the fruits mostly narcotic, often very poisonous, while some are edible.) — A large family in the tropics, but very few indigenous in our district. It shades off into Scrophulariaceæ, from which the plaited regular corolla and 5 equal stamens generally distinguish it.

* Corolla wheel-shaped, 5-parted or 5-lobed; the lobes valvate and their margins usually turned inward in the bud. Anthers connivent. Fruit a berry.

1. **Solanum.** Anthers opening by pores or chinks at the tip.

* * Corolla various, not wheel-shaped, nor valvate in the bud. Anthers separate.

+ Fruit a berry, closely invested by an herbaceous (not angled) calyx.

2. **Chamæsaracha.** Corolla plicate, 5-angulate. Pedicels solitary, recurved in fruit.

+ \+ Fruit a berry, enclosed in the bladdery-inflated calyx. Corolla widely expanding.

3. **Physalis.** Calyx 5-cleft. Corolla 5-lobed or nearly entire. Berry juicy, 2-celled.
4. **Nicandra.** Calyx 5-parted. Corolla nearly entire. Berry dry, 3–5-celled.

+ \+ \+ Fruit a berry with the unaltered calyx persistent at its base.

5. **Lycium.** Corolla funnel-form or tubular, not plaited. Berry small, 2-celled.

+ \+ \+ \+ Fruit a capsule.

6. **Hyoscyamus.** Calyx urn-shaped, enclosing the smooth 2-celled capsule, which opens by the top falling off as a lid. Corolla and stamens somewhat irregular.
7. **Datura.** Calyx prismatic, 5-toothed. Capsule prickly, naked, more or less 4-celled, 4-valved. Corolla funnel-form.
8. **Nicotiana.** Calyx tubular-bell-shaped, 5-cleft. Capsule enclosed in the calyx, 2-celled.

### 1. SOLÀNUM, Tourn. NIGHTSHADE.

Calyx and wheel-shaped corolla 5-parted or 5-cleft (rarely 4–10-parted), the latter plaited in the bud, and valvate or induplicate. Stamens exserted; filaments very short; anthers converging around the style, opening at the tip by two pores or chinks. Berry usually 2-celled. — Herbs, or shrubs in warm climates, the larger leaves often accompanied by a smaller lateral (rameal) one; the peduncles also mostly lateral and extra-axillary. — A vast genus, chiefly in warmer regions, including the POTATO (S. TUBERÒSUM) and the EGG-PLANT (S. MELONGÈNA); while the TOMATO (LYCOPÉRSICUM ESCULÉNTUM) is closely related. (Name of unknown derivation.)

* *Not prickly; anthers blunt; flowers and globose naked berries small.*

+ *Perennial, climbing or twining.*

**S.** DULCAMÀRA, L. (BITTERSWEET.) More or less pubescent; leaves ovate-heart-shaped, the upper halberd-shaped, or with two ear-like lobes or leaflets at base; flowers (purple or blue) in small cymes; berries oval, red. — Moist banks and around dwellings. June – Sept. (Nat. from Eu.)

+- +- *Simple-leaved annuals.*

1. **S. triflòrum,** Nutt. Low, spreading, slightly hairy or nearly glabrous; *leaves oblong, pinnatifid* (7–9-lobed) with rounded sinuses; peduncles 1–3-flowered; corolla white; *berries green*, as large as a small cherry. — Central Kan., and westward; chiefly a weed near dwellings.

2. **S. nìgrum,** L. (Common Nightshade.) Low, much branched and often spreading, nearly glabrous, rough on the angles; *leaves ovate, wavy-toothed; flowers* white, *in small umbel-like lateral clusters*, drooping; *calyx spreading;* filaments hairy; *berries* globular, *black*. — Shaded grounds and fields; common, appearing as if introduced, but a cosmopolite. July–Sept.

Var. VILLÒSUM, Mill. Low, somewhat viscid-pubescent or villous; leaves small, conspicuously angular-dentate; filaments glabrous; berries yellow. — Established near Philadelphia, from ballast. (Adv. from Eu.)

**S.** GRÁCILE, Link. Cinereous-pubescent or puberulent, rather tall (2–3° high), with virgate spreading branches; leaves *ovate and ovate-lanceolate, nearly entire;* corolla white or bluish; *calyx somewhat appressed to the black berry.* — Coast of N. C., and about ballast near Philadelphia. (Adv. from S. Am.)

* * *More or less prickly; anthers tapering upward; pubescence stellate.*

+- *Perennial; fruit naked; anthers equal; corolla violet, rarely white.*

3. **S. Carolinénse,** L. (Horse-Nettle.) *Hirsute or roughish-pubescent with* 4–8-*rayed hairs: prickles stout, yellowish,* copious (rarely scanty); *leaves oblong* or ovate, obtusely sinuate-toothed or lobed or sinuate-pinnatifid; racemes simple, soon lateral; *calyx-lobes acuminate; berries about* 6″ *broad.* — Sandy soil and waste grounds, Conn. to Iowa, south to Fla. and Tex.

4. **S. elæagnifòlium,** Cav. *Silvery-canescent with* dense scurf-like pubescence of *many-rayed hairs; prickles small, slender,* more or less copious or wanting; *leaves lanceolate* to oblong and linear, sinuate-repand or entire; *calyx-lobes slender;* berry *seldom* 6″ *in diameter.* — Prairies and plains, E. Kan. to Tex., and westward.

5. **S. Torrèyi,** Gray. *Cinereous with a somewhat close pubescence of* about *equally* 9–12-*rayed hairs: prickles small and stout,* scanty or nearly wanting; *leaves ovate* with truncate or slightly cordate base, sinuately 5–7-lobed (4–6′ long); *calyx-lobes short-ovate, abruptly long-acuminate;* berry 1′ *in diameter.* — Prairies, etc., E. Kan. and Tex.

+- +- *Annual; fruit closely covered; lowest anther much the longest, corolla yellow.*

6. **S. rostràtum,** Dunal. Very prickly, somewhat hoary or yellowish with a copious wholly stellate pubescence (1–2° high); leaves 1–2-pinnatifid; calyx densely prickly; stamens and style much declined. — Plains of Neb. to Tex.; spreading eastward to Ill. and Tenn.

### 2. CHAMÆSÁRACHA, Gray.

Calyx herbaceous, closely investing the globose berry (or most of it), obscurely if at all veiny. Corolla rotate, 5-angulate, plicate in the bud. Filaments filiform; anthers separate, oblong. — Perennials, with mostly narrow entire or pinnatifid leaves tapering into margined petioles, and filiform naked pedicels solitary in the axils, refracted or recurved in fruit. (*Saracha* is a tropical American genus dedicated to *Isidore Saracha*, a Spanish Benedictine; the prefix χαμαί, *on the ground.*)

1. **C. sórdida,** Gray. Much branched from root or base, somewhat cinereous with short viscid pubescence; leaves obovate-spatulate or cuneate-oblong to oblanceolate, repand to incisely pinnatifid; calyx when young villous-viscid; corolla pale yellow or violet-purple (6″ broad); berry as large as a pea. — Dry or clayey soil, central and W. Kan. to Tex. and Arizona.

### 3. PHÝSALIS, L. Ground Cherry.

Calyx 5-cleft, reticulated and enlarging after flowering, at length much inflated and enclosing the 2-celled globular (edible) berry. Corolla between wheel-shaped and funnel-form, the very short tube marked with 5 concave spots at the base; the plaited border somewhat 5-lobed or barely 5 – 10-toothed. Stamens 5, erect; anthers separate, opening lengthwise. — Herbs (in this country), with the leaves often unequally in pairs, and the 1-flowered nodding peduncles extra-axillary; flowering through the summer. (Name φυσαλίς, *a bladder*, from the inflated calyx.)

* *Corolla large, white or tinged with blue, without dark centre, with almost entire border; pubescence simple.*

1. **P. grandiflòra,** Hook. Clammy-pubescent, erect; leaves lance-ovate, pointed, entire or nearly so; corolla 1 – 2′ wide when expanded, and with a woolly ring in the throat; fruiting calyx globular, apparently nearly filled by the berry. — S. shore of L. Superior to Sask.; Providence Island, L. Champlain (*Perkins*).

* * *Corolla lurid greenish-white or yellow, mostly with dark centre, 3 – 10″ broad.*

+ *Annuals, glabrous or pubescence minute; anthers violet.*

2. **P. Philadélphica,** Lam. Leaves ovate or oblong-ovate, oblique at base, entire, repand, or very sparingly angulate-toothed; *corolla brownish- or violet-spotted in the centre, 7 – 10″ broad;* calyx at maturity globose and completely filled by the large reddish or purple berry and open at the mouth. — In fertile soil, Penn. to Minn. and Tex.

3. **P. angulàta,** L. Much branched; leaves ovate or ovate-oblong, sharply and irregularly *laciniate-toothed;* peduncles filiform; *corolla unspotted, very small* (3 – 6″ broad when expanded); fruiting calyx conical-ovate with a truncate or sunken base, 10-angled, loosely inflated, at length well filled by the greenish-yellow berry. — Open rich grounds, Penn. to Minn., and southward.

+ + *Strong-scented, villous or pubescent with viscid or glandular simple hairs; fruiting calyx ovate-pyramidal, carinately 5-angled, closed, loosely enveloping the green or yellow berry; leaves ovate or cordate.*

4. **P. pubéscens,** L. *Annual,* diffusely much branched or at length decumbent; leaves angulate- or repand-toothed or nearly entire; *corolla* spotted with brown purple in the centre, 5 – 6″ *broad* when expanded, obscurely 5 – 10-toothed; *anthers violet.* — Low grounds, N. Y. to Minn., south to Fla. and Tex., and westward. — A very doubtful form, found at Independence, Mo. (*B. F. Bush*), has the small corolla (2″ broad) yellow, without a brown centre, the anthers yellow, the fruiting calyx smaller, and the berry viscid.

5. **P. Virginiàna,** Mill. *Perennial,* diffusely much branched and widely spreading, or at first erect; leaves sometimes oblong, repand or obtusely toothed, rarely entire; *corolla* 9 – 12″ *broad,* 5-angled or 5 – 10-toothed; *anthers yellow.*

(P. viscosa, *Gray*, Man., not *L.*) — Light or sandy soils, Ont. and Minn. to Fla. and Tex. — Var. AMBÍGUA, Gray, is a coarse and very villous form with violet anthers. Wisc., and westward.

+ + + *Perennials, mostly low, not viscid; pubescence stellate or simple or nearly none; anthers almost always yellow.*

6. **P. viscòsa,** L. *Cinereous or when young almost canescent with short stellate or 2 – 3-forked pubescence;* stems ascending or spreading from *slender creeping subterranean shoots; leaves ovate or oval,* varying to oblong and obovate, entire or undulate; corolla greenish-yellow, with a more or less dark eye; *fruiting calyx globose-ovate; berry yellow or orange.* — In sands on and near the coast, Va. to N. C. and Fla.

7. **P. lanceolàta,** Michx. *More or less hirsute-pubescent with short stiff mostly simple hairs,* varying to nearly glabrous; stems from rather *stout subterranean shoots,* angled, somewhat rigid; *leaves oblong-ovate to narrowly lanceolate,* sparingly angulate-toothed to undulate or entire; corolla ochroleucous, with a more or less dark eye; *calyx commonly hirsute, in fruit pyramidal-ovate* (1 – 1½′ long); *berry reddish.* (P. Pennsylvanica, *Gray*, Man., in part; not *L.*) — Dry open ground, Penn. to Ill., Minn., and south and westward.

Var. **lævigàta,** Gray. Glabrous or almost so throughout, or with some very short hairs on young parts. — Neb. to Tex., and westward.

Var. **hírta,** Gray. A remarkable ambiguous form, with much of the hirsute-pubescence of the leaves 2 – 3-forked, as also are some of the abundant villous-hispid hairs of the stem. — Wet woods, Tex. to Mo., and E. Kan.

### 4. NICÁNDRA, Adans. Apple of Peru.

Calyx 5-parted, 5-angled, the divisions rather arrow-shaped, enlarged and bladder-like in fruit, enclosing the 3 – 5-celled globular dry berry. Corolla with border nearly entire. Otherwise much like Physalis. — An annual smooth herb (2 – 3° high), with ovate sinuate-toothed or angled leaves, and solitary pale blue flowers on axillary and terminal peduncles. (Named after the poet *Nicander* of Colophon.)

**N.** PHYSALOÌDES, Gaertn. — Waste grounds, near dwellings and old gardens. (Adv. from Peru.)

### 5. LÝCIUM, L. Matrimony-Vine.

Calyx 3 – 5-toothed or -cleft, not enlarging, persistent at the base of the berry. Corolla funnel-form or salver-shaped, 5-lobed, the lobes imbricated and not plaited in the bud. Stamens 5; anthers opening lengthwise. Style slender; stigma capitate. Berry small, 2-celled. Shrubby, often spiny plants, with alternate and entire small leaves, and mostly axillary small flowers. (Named from the country, *Lycia.*)

**L.** VULGÀRE, Dunal. (Common M.) Shrub with long sarmentose recurved-drooping branches, smooth, sparingly if at all spiny; leaves oblong- or spatulate-lanceolate, often fascicled, narrowed into a short petiole; flowers on slender peduncles fascicled in the axils; corolla short funnel-form, greenish-purple; style and slender filaments equalling its lobes; berry oval, orange-red. — About dwellings, and escaped into waste grounds in Penn., etc. (Adv. from Eu.)

### 6. HYOSCỲAMUS, Tourn. Henbane.

Calyx bell-shaped or urn-shaped, 5-lobed. Corolla funnel-form, oblique, with a 5-lobed more or less unequal plaited border. Stamens declined. Capsule enclosed in the persistent calyx, 2-celled, opening transversely all round near the apex, which falls off like a lid. — Clammy-pubescent, fetid, narcotic herbs, with lurid flowers in the axils of angled or toothed leaves. (Name composed of ὗς, ὑός, *a hog*, and κύαμος, *a bean;* said to be poisonous to swine.)

**H. nìger**, L. (Black Henbane.) Biennial or annual; leaves clasping, sinuate-toothed and angled; flowers sessile, in one-sided leafy spikes; corolla dull yellowish, strongly reticulated with purple veins. — Escaped from gardens to roadsides. (Adv. from Eu.)

## 7. DATÙRA, L. Jamestown-Weed. Thorn-Apple.

Calyx prismatic, 5-toothed, separating transversely above the base in fruit, the upper part falling away. Corolla funnel-form, with a large and spreading 5–10-toothed plaited border. Stigma 2-lipped. Capsule globular, prickly, 4-valved, 2-celled, with 2 thick placentæ projected from the axis into the middle of the cells, and connected with the walls by an imperfect false partition, so that the capsule is 4-celled except near the top, the placentæ as if on the middle of these false partitions. Seeds rather large, flat. — Rank weeds, narcotic-poisonous, with ovate leaves, and large showy flowers on short peduncles in the forks of the branching stem; produced all summer and autumn. (Altered from the Arabic name, *Tatorah.*)

**D. Stramònium**, L. (Common Stramonium or Thorn Apple.) Annual, glabrous; leaves ovate, sinuate-toothed or angled; *stem green; corolla white* (3′ long), the border with 5 teeth; lower prickles of the capsule mostly shorter. — Waste grounds; a well-known ill-scented weed. (Adv. from Asia?)

**D. Tátula**, L. (Purple T.) Mostly taller; *stem purple; corolla pale violet-purple;* prickles of the capsule nearly equal. — Waste grounds, in the Atlantic States. (Adv. from trop. Amer.)

## 8. NICOTIÀNA, Tourn. Tobacco.

Calyx tubular-bell-shaped, 5-cleft. Corolla funnel-form or salver-form, usually with a long tube; the plaited border 5-lobed. Stigma capitate. Capsule 2-celled, 2–4-valved from the apex. Seeds minute. — Rank acrid-narcotic herbs, mostly clammy-pubescent, with ample entire leaves, and racemed or panicled flowers. (Named after *John Nicot*, who was thought to have introduced Tobacco (N. Tabácum, L.) into Europe.)

**N. rústica**, L. (Wild Tobacco.) Annual; leaves ovate, petioled; tube of the dull greenish-yellow corolla cylindrical, two thirds longer than the calyx, the lobes rounded. — Old fields, from N. Y. westward and southward; a relic of cultivation by the Indians. (Of unknown nativity.)

## Order 75. SCROPHULARIÀCEÆ. (Figwort Family.)

*Chiefly herbs* (*rarely trees*), *with didynamous stamens* (*or perfect stamens often only* 2, *rarely* 5) *inserted on the tube of the* 2-*lipped or more or less irregular corolla, the lobes of which are imbricated in the bud: fruit a* 2-*celled and usually many-seeded capsule, with the placentæ in the axis; seeds anatropous, or amphitropous, with a small embryo in copious albumen.* — Style single; stigma entire or 2-lobed. Leaves and inflorescence various; but the flowers not terminal in any genuine representatives of the order. — A large order of bitterish plants, some of them narcotic-poisonous.

I. ANTIRRHINIDEÆ. Upper lip or lobes of the corolla covering the lower in the bud (with occasional exceptions in Mimulus, etc.) Capsule usually septicidal.

**Tribe I. VERBASCEÆ.** Corolla rotate. Flowers racemose. Leaves alternate.

1. **Verbascum.** Stamens 5, all with anthers, and 3 or all with bearded filaments.

**Tribe II. ANTIRRHINEÆ.** Corolla tubular, with a spur or sac at the base below, the throat usually with a palate. Capsule opening by chinks or holes. Flowers in simple racemes or axillary. Lower leaves usually opposite or whorled. Stamens 4.

2. **Linaria.** Corolla spurred at base; the palate seldom closing the throat.
3. **Antirrhinum.** Corolla merely saccate at base; the palate closing the throat.

**Tribe III. CHELONEÆ.** Corolla tubular, or 2-lipped, not spurred nor saccate below. Capsule 2–4-valved. Leaves opposite Inflorescence usually compound, of small axillary spiked or racemed or umbel-like clusters or cymes, or when reduced to a single flower the peduncle mostly 2-bracteate. Stamens 4, and usually a rudiment of the fifth.

4 **Scrophularia.** Corolla inflated, globular or oblong, with four erect lobes and one spreading one Rudiment of the sterile stamen a scale on the upper lip.
5 **Collinsia.** Corolla 2-cleft, the short tube saccate on the upper side; the middle lobe of the lower lip sac-like and enclosing the declined stamens.
6. **Chelone.** Corolla tubular inflated above. Sterile stamen shorter than the others. Anthers very woolly. Seeds winged.
7 **Pentstemon.** Corolla tubular. Sterile stamen about as long as the rest. Seeds wingless.

**Tribe IV. GRATIOLEÆ.** Corolla tubular, not saccate nor spurred. Capsule 2-valved. Flowers solitary in the axils of bracts or leaves; peduncles naked (or 2-bracteolate in n. 12). Leaves all or the lower ones opposite. No trace of a fifth stamen.

* Stamens 4, all anther-bearing and similar.

8. **Mimulus.** Calyx prismatic, 5-angled, 5-toothed. Corolla elongated.
9. **Conobea.** Calyx 5-parted, the divisions equal. Corolla short.
10. **Herpestis.** Calyx 5-parted, unequal, the upper division largest. Corolla short.
11 **Limosella.** Calyx 5-toothed. Corolla open bell-shaped, 5-cleft, nearly regular. Leaves alternate or fascicled, fleshy. Dwarf aquatic or marsh plant.

* * Anther-bearing stamens 2; usually also a pair of sterile filaments.

12. **Gratiola.** Calyx 5-parted. Stamens included; the sterile pair short or none.
13 **Ilysanthes** Calyx 5-parted. Stamens included. the sterile filaments protruded.
14. **Micranthemum.** Flowers minute. Calyx 4-toothed or cleft. Upper lip of corolla short or none. Filaments with an appendage; sterile pair none. Dwarf aquatic.

## II. RHINANTHIDEÆ. Under lip or the lateral lobes of the corolla covering the upper in the bud. Capsule commonly loculicidal.

**Tribe V. DIGITALEÆ.** Corolla wheel-shaped, salver-shaped, or bell-shaped. Stamens 2 or 4, not approaching in pairs nor strongly didynamous; anthers 2 celled.

15. **Synthyris.** Calyx 4-parted. Corolla bell-shaped, 2–4-lobed, irregular Stamens 2 or 4. Leaves alternate Flowers racemed.
16. **Veronica** Calyx 4-(rarely 3-5-) parted. Corolla wheel-shaped or salver-shaped, almost regular Stamens 2. Leaves chiefly opposite or whorled. Flowers racemed.

**Tribe VI. GERARDIEÆ.** Corolla with a spreading and slightly unequal 5-lobed limb Stamens 4, approximate in pairs. Leaves opposite, or the uppermost alternate.

* Corolla salver-shaped. Anthers 1-celled. Flowers in a spike.

17. **Buchnera.** Calyx tubular, 5-toothed. Limb of the elongated corolla 5-cleft.

* * Corolla bell-shaped to funnel-form; anthers 2-celled.

18. **Seymeria.** Stamens nearly equal. Tube of the corolla broad, not longer than the lobes.
19. **Gerardia.** Stamens strongly unequal, included.

**Tribe VII. EUPHRASIEÆ.** Corolla tubular, obviously 2-lipped; the upper lip narrow, erect or arched, enclosing the 4 usually strongly didynamous stamens.

* Anther-cells unequal and separated Capsule many-seeded.

20. **Castilleia.** Calyx tubular, cleft down the lower, and often also on the upper, side. Upper lip of corolla elongated; the lower short, often very small.

21. **Orthocarpus.** Calyx tubular-campanulate, 4-cleft. Upper lip of corolla little longer and usually much narrower than the inflated lower one.

* * Anther-cells equal. Capsule many - several-seeded.

22. **Schwalbea.** Calyx 5-toothed, very oblique, the upper tooth much the smallest.
23. **Euphrasia.** Calyx 4-cleft. Upper lip of the corolla 2-lobed, and sides folded back. Capsule oblong.
24. **Bartsia.** Calyx 4-cleft. Upper lip of corolla entire and sides not folded back.
25. **Rhinanthus.** Calyx inflated, ovate Capsule orbicular: seeds winged.
26. **Pedicularis.** Calyx not inflated. Capsule ovate or sword-shaped; seeds wingless.

* * * Anther-cells equal. Capsule 1 – 4-seeded.

27. **Melampyrum.** Calyx 4-cleft. Ovary 2-celled, 4-ovuled. Capsule flat, oblique.

## 1. VERBÁSCUM, L. Mullein.

Calyx 5-parted. Corolla 5-lobed, open or concave, wheel-shaped; the lobes broad and rounded, a little unequal Stamens 5, all the filaments, or the 3 upper, woolly. Style flattened at the apex. Capsule globular, many-seeded. — Tall and usually woolly biennial herbs, with alternate leaves, those of the stem sessile or decurrent. Flowers in large terminal spikes or racemes, ephemeral; in summer. (The ancient Latin name, altered from *Barbascum.*)

**V.** Thápsus, L. (Common Mullein) *Densely woolly throughout: stem tall and stout, simple,* winged by the decurrent bases of the oblong acute leaves: *flowers* (yellow, very rarely white) *in a prolonged and very dense cylindrical spike;* lower stamens usually beardless. — Fields, a common weed. (Nat. from Eu.)

**V.** Blattària, L. (Moth M.) *Green and smoothish, slender;* lower leaves petioled, oblong, doubly serrate, sometimes lyre-shaped, the upper partly clasping; *raceme loose;* filaments all bearded with violet wool. — Roadsides, throughout our range. Corolla either yellow, or white with a tinge of purple. (Nat. from Eu.)

**V.** Lychnìtis, L. (White M.) *Clothed with thin powdery woolliness;* stem and branches angled above; leaves ovate, acute, not decurrent, greenish above; *flowers* (yellow, rarely white) *in a pyramidal panicle;* filaments with whitish wool. — Fields, N. Atlantic States, rather rare. (Adv. from Eu.)

## 2. LINÀRIA, Tourn. Toad-Flax.

Calyx 5-parted. Corolla personate, with the prominent palate often nearly closing the throat, spurred at base on the lower side. Stamens 4. Capsule thin, opening below the summit by one or two pores or chinks. Seeds many. — Herbs, with at least all the upper leaves alternate (in ours), fl. in summer. (Name from *Linum,* the Flax, which the leaves of some species resemble.)

* *Slender glabrous annual or biennial: leaves linear, entire and alternate (or smaller, oblong, and opposite on procumbent shoots), small blue flowers in a naked terminal raceme.*

1. **L. Canadénsis,** Dumont. Flowering stems nearly simple (6 – 30′ high); leaves flat (1 – 2″ wide); pedicels erect, not longer than the filiform curved spur of the corolla. — Sandy soil, common.

* * *Perennial, erect (1 – 3° high), glabrous, with narrow entire and alternate pale leaves, and yellow flowers in a terminal raceme.*

**L.** vulgàris, Mill. (Ramsted. Butter and Eggs.) Leaves linear or nearly so, extremely numerous, raceme dense; corolla 1′ long or more, including the slender subulate spur; seeds winged. — Fields and roadsides, throughout our range. (Nat. from Eu.)

**L.** GENISTIFÒLIA, Mill. Glaucous, paniculately branched; leaves lanceolate, acute; flowers smaller and more scattered; seeds wingless. — Sparingly naturalized near New York. (Nat. from Eu.)

* * * *Annual, procumbent, much branched, with broad petioled veiny alternate leaves, and small purplish and yellow flowers from their axils.*

**L.** ELATÌNE, Mill. Spreading over the ground, slender, hairy; leaves hastate or the lower ovate, much surpassed by the filiform peduncles; calyx-lobes lanceolate, acute; corolla 3–4″ long, including the subulate spur. — Sandy banks and shores, Canada to N. C., rather rare. (Nat. from Eu.)

**L.** SPÙRIA, Mill. Like the preceding, but with roundish or cordate leaves and ovate or cordate calyx-lobes. — Occasionally occurs on ballast or waste grounds near cities. (Nat. from Eu.)

## 3. ANTIRRHÌNUM, Tourn. SNAPDRAGON.

Corolla saccate at the base, the throat closed by the large bearded palate. Seeds oblong-truncate. Otherwise nearly as Linaria. — Corolla commonly showy, resembling the face of an animal or a mask; whence the name (from ἀντί, *like*, and ῥίν, *a snout*.) Fl. summer and autumn.

**A.** ORÓNTIUM, L. A small-flowered annual or biennial, low, erect; leaves lance-linear; spike loose, leafy; sepals longer than the purplish or white corolla. — About gardens and old fields in Atlantic States. (Adv. from Eu.)

**A.** MÀJUS, L. (LARGE SNAPDRAGON.) A large-flowered perennial, with oblong smooth leaves and a glandular-downy raceme; sepals short; corolla 1½–2′ long, purple or white. — Eastward, escaping from gardens. (Adv. from Eu.)

## 4. SCROPHULÀRIA, Tourn. FIGWORT.

Calyx deeply 5-cleft. Corolla with a somewhat globular tube; the 4 upper lobes of the short border erect (the two upper longer), the lower spreading. Stamens 4, declined, with the anther-cells transverse and confluent into one; the fifth stamen a scale-like rudiment at the summit of the tube of the corolla. Capsule many-seeded. — Rank herbs, with mostly opposite leaves, and small greenish-purple or lurid flowers in loose cymes, forming a terminal narrow panicle. (So called because a reputed remedy for *scrofula.*)

1. **S. nodòsa,** L., var. **Marilándica,** Gray. Smooth perennial (3–5° high); stem 4-sided; leaves ovate, oblong, or the upper lanceolate, acuminate, cut-serrate, rounded or rarely heart-shaped at base. — Damp grounds, N. Eng. to Fla., west to the Rocky Mts. (Eu., Asia, the type.)

## 5. COLLÍNSIA, Nutt.

Calyx deeply 5-cleft. Corolla declined, with the tube saccate or bulging at the base on the upper side, deeply 2-lipped; the upper lip 2-cleft, its lobes partly turned backward, the lower 3-cleft, its middle lobe keeled and sac-like, enclosing the 4 declined stamens and style. Fifth stamen a gland-like rudiment. Capsule 4–many-seeded. — Slender branching annuals or biennials, with opposite leaves, and handsome party-colored flowers in umbel-like clusters, appearing whorled in the axils of the upper leaves. (Dedicated to the late *Zaccheus Collins,* of Philadelphia, an accurate botanist.)

1. **C. vérna,** Nutt. Slender (6–20′ high), lower leaves ovate, the upper ovate-lanceolate, clasping by the heart-shaped base, toothed; *whorls about 6-flowered; flowers long-peduncled; corolla* (*blue and white*) *twice the length of the calyx.* — Moist soil. western N. Y. to W. Va., Wisc. and Ky. May, June.

2. **C. parviflòra,** Dougl. Small; lower leaves ovate or rounded, the upper oblong-lanceolate, mostly entire; *whorls 2–6-flowered; flowers short-peduncled;* the small (blue) *corolla scarcely exceeding the calyx.* — Shore of L. Superior, N. Mich., and westward.

### 6. CHELÒNE, Tourn. TURTLE-HEAD. SNAKE-HEAD.

Calyx of 5 distinct imbricated sepals. Corolla inflated-tubular, with the mouth a little open; upper lip broad and arched, keeled in the middle, notched at the apex; the lower woolly-bearded in the throat, 3-lobed at the apex, the middle lobe smallest. Stamens 4, with woolly filaments and very woolly heart-shaped anthers, and a fifth sterile filament smaller than the others. Seeds many, wing-margined. — Smooth perennials, with upright branching stems, opposite serrate leaves, and large white or purple flowers, which are nearly sessile in spikes or clusters, and closely imbricated with round-ovate concave bracts and bractlets. (Name from χελώνη, *a tortoise,* the corolla resembling in shape the head of a reptile.)

1. **C. glàbra,** L. A foot or two (or even 6–7°) high; *leaves narrowly to rather broadly lanceolate* (4–5′ long, 4–12″ wide), gradually acuminate, serrate with sharp appressed teeth, narrowed at base usually into a very short petiole; *bracts not ciliate; corolla white, or barely tinged with rose.* — Wet places, Newf. to Minn., south to Fla. and Tex.

2. **C. oblìqua,** L. Less strict or with spreading branches, 1–2° high; *leaves broadly lanceolate to oblong* (2–5′ long), sometimes laciniately serrate, more veiny and duller, acute or obtuse at base, mostly short-petioled; *bracts ciliolate; corolla deep and bright rose-color.* — S. Ill. to Va. and Fla.

### 7. PENTSTÈMON, Mitchell. BEARD-TONGUE.

Calyx 5-parted. Corolla tubular and more or less inflated, or bell-shaped, either decidedly or slightly 2-lipped; the upper lip 2-lobed, and the lower 3-cleft. Stamens 4, declined at the base, ascending above, and a fifth sterile filament usually as long as the others, either naked or bearded. Seeds numerous, wingless. — Perennials, branched from the base, simple above, with opposite leaves, the upper sessile and mostly clasping. Flowers mostly showy, thyrsoid or racemose-panicled. (Name from πέντε, *five,* and στήμων, *stamen;* the fifth stamen being present and conspicuous, although sterile.)

* *Viscid or glandular above, more or less pubescent or glabrous below; leaves often toothed or denticulate.*

+– *Thyrse somewhat open; leaves ovate-lanceolate to linear; corolla 9–12″ long, the lower lip usually bearded within.*

1. **P. pubéscens,** Solander. *Stem 1–2° high, viscid-pubescent* (at least the inflorescence); *leaves oblong to lanceolate* (2–4′ long), the lowest and radical ovate or oblong, usually denticulate; *thyrse narrow; corolla dull violet or purple* (or partly whitish), *very moderately dilated, the throat nearly closed by a villous-bearded palate; sterile filament densely bearded.* — Dry or rocky grounds, S. Maine (*Miss Furbish*) to Minn., south to Fla. and Tex.

2. **P. lævigàtus,** Solander. *Stem 2–4° high, mostly glabrous* except the inflorescence; leaves *firmer,* somewhat glossy, the *cauline ovate- or oblong-*

*lanceolate* with subcordate clasping base (2–5′ long); *thyrse broader; corolla white* (commonly tinged with purple), *abruptly and broadly inflated, the throat widely open; sterile filament thinly bearded above.* — Moist or rich soil, Penn. to Fla. and westward, where the common form is

Var. **Digitàlis,** Gray. Stem sometimes 5° high; corolla larger and more abruptly inflated, white. (P. Digitalis, *Nutt.*) — Penn. to Iowa, Mo., Ark., etc.

3. **P. grácilis,** Nutt. Glabrous or puberulent, viscid-pubescent above, 1° high or less; stem-leaves mostly linear-lanceolate, the radical spatulate or oblong; corolla tubular-funnel-form or nearly cylindrical with open throat, lilac-purple or whitish. — Minn. to Mo., and westward.

++ ++ *Thyrse raceme-like. All extreme western.*

4. **P. Cobæa,** Nutt. *Soft-puberulent,* 1° high; *leaves ovate or oblong,* or the lower broadly lanceolate and the upper cordate-clasping, *mostly sharply toothed;* thyrse short; *corolla 2′ long, broadly ventricose,* dull purple or whitish. — Prairies, Kan. to Tex.

5. **P. tubiflòrus,** Nutt. *Wholly glabrous* excepting the viscid ovate sepals, 2–3° high; *leaves oblong or ovate-lanceolate, entire or sparsely toothed,* the floral shorter than the remote dense clusters of the virgate thyrse; *corolla 9″ long, the narrow tube gradually dilated upward,* white or whitish. — Low prairies, Kan. and Ark.

6. **P. álbidus,** Nutt. *Viscid-pubescent,* 6–10′ high; *leaves oblong-lanceolate or narrow,* entire or sparsely toothed; *clusters* of the strict thyrse few-flowered, *approximate; sepals lanceolate, densely pubescent; corolla* 9″ long, *with shorter tube and more dilated throat.* — Plains, Neb. to Dak. and Tex.

* * *Glabrous throughout and glaucous; leaves sessile, entire; thyrse raceme-like.*

7. **P. grandiflòrus,** Nutt. Stem 2–4° high; *leaves* thickish, the upper and floral *rounded, all but the obovate radical ones clasping or perfoliate;* pedicels short; *corolla 2′ long, oblong-campanulate,* nearly regular, lilac or lavender-blue; sterile filament hooked and minutely bearded at the apex. — Prairies, from Ill. and Wisc. to Dak., Neb., and Kan.

8. **P. glàber,** Pursh. Stems 1–2° high; *leaves* mostly *oblong-lanceolate or the upper ovate-lanceolate;* thyrse elongated, the peduncles and pedicels very short; *corolla 1–1½′ long,* bright blue to violet-purple, *dilated above;* anthers and apex of sterile filament glabrous or sparsely hirsute. — Plains of E. Neb. to Dak., and westward.

9. **P. acuminàtus,** Dougl. Stem 6–20′ high, stout; *leaves* thick, the lower *obovate or oblong, the upper lanceolate to broadly ovate or cordate-clasping,* acute or acuminate; thyrse leafy below, very narrow; *corolla 9″ long,* lilac or violet; sterile filament mostly bearded above. — Kan. to Minn., and westward.

### 8. MÍMULUS, L. MONKEY-FLOWER.

Calyx prismatic, 5-angled, 5-toothed, the upper tooth largest. Corolla tubular; upper lip erect or reflexed-spreading, 2-lobed; the lower spreading, 3-lobed. Stamens 4. Stigma 2-lobed, the lobes ovate. Seeds numerous. — Herbs, with opposite leaves, and mostly handsome flowers on solitary axillary and bractless peduncles. (Diminutive of *mimus,* a buffoon, from the grinning corolla.)

* *Erect from a perennial root, glabrous; leaves feather-veined; corolla violet-purple.*

1. **M. ríngens,** L. Stem square (1 – 2° high); *leaves oblong or lanceolate, pointed, clasping* by a heart-shaped base, serrate; peduncles longer than the flower; calyx-teeth taper-pointed, nearly equal; corolla personate. — Wet places, N. Eng. to Minn., and southward; common. July – Sept. — Flower 1 – 1½′ long, rarely white.

2. **M. alàtus,** Ait. Stem somewhat winged at the angles; *leaves oblong-ovate, tapering into a petiole;* peduncles shorter than the calyx, which has very short abruptly pointed teeth; otherwise like the last. — Wet places, western N. Eng. to Ill., south to N. C. and Tex.

* * *Leaves several-nerved and veiny, dentate, the upper sessile and clasping; calyx oblique, the upper tooth longest; corolla yellow, the lower lip bearded.*

3. **M. Jamèsii,** Torr. Diffusely spreading, smooth or smoothish; stems creeping at base; stem-leaves roundish or kidney-shaped, nearly sessile, equalling the peduncles; calyx ovate, inflated in fruit; throat of corolla broad and open. — In water or wet places, usually in springs, N. Mich. and Minn. to Ill., Kan., and westward.

**M.** LÙTEUS, L. Erect or with later branches spreading; leaves ovate to roundish or subcordate; corolla deep yellow, with brown-purple dots or blotches, often large. — Wet meadows, Norfolk, Ct. (Adv. from Calif.)

## 9. CONÒBEA, Aublet.

Calyx 5-parted, equal. Upper lip of corolla 2-lobed, the lower 3-parted. Stamens 4, fertile; anthers approximate. Stigma 2-lobed, the lobes wedge-form. Seeds numerous. — Low branching herbs, with opposite leaves, and small solitary flowers on axillary peduncles. (Name unexplained.)

1. **C. multífida,** Benth. Annual, diffusely spreading, much branched, minutely pubescent; leaves petioled, pinnately parted, divisions linear-wedge-shaped; peduncles naked; corolla (greenish-white) scarcely longer than the calyx. — Along streams and shores, Ohio to Ill., Ark., and Tex.; also adv. below Philadelphia. July – Sept.

## 10. HERPÈSTIS, Gaertn. f.

Calyx 5-parted; the upper division broadest, the innermost often very narrow. Upper lip of the corolla entire, notched or 2-cleft, and the lower 3-lobed, or the limb nearly equally 5-lobed. Stamens 4, all fertile. Style dilated or 2-lobed at the apex. Seeds numerous. — Low herbs, with opposite leaves, and solitary axillary flowers; in summer; ours rather succulent perennials. (Name from ἑρπηστής, *a creeping thing,* the species being chiefly procumbent.)

* *Corolla plainly bilabiate, the 2 upper lobes united to form the upper lip; leaves many-nerved.*

1. **H. nigréscens,** Benth. Erect or ascending, very leafy, glabrous; leaves pinnately veined, oblong to cuneate-lanceolate (1 – 2′ long), serrate; pedicels equalling and the upper surpassing the leaves; corolla whitish or purplish. — Wet places, Md. and N. C. to Tex., along and near the coast.

2. **H. rotundifòlia,** Pursh. Nearly smooth, creeping; *leaves round-obovate, half-clasping* (½ – 1′ long), entire, basally nerved; *peduncles twice or thrice the length of the calyx;* upper sepal ovate; corolla white or pale blue. — Margins of ponds, Ill. to Minn., Mo., and southward.

3. **H. amplexicaùlis,** Pursh. Stems hairy, creeping at base; *leaves ovate, clasping,* entire, basally nerved; *peduncles shorter than the calyx;* upper sepal heart-shaped; corolla blue. — Margin of pine-barren ponds, N. J. and Md. to La. — Aromatic when bruised.

* * *Corolla obscurely bilabiate, the limb subequally 5-lobed; stamens almost equal.*

4. **H. Monnièra,** HBK. Glabrous, prostrate and creeping; leaves spatulate to obovate-cuneate, entire or somewhat toothed, nearly nerveless, sessile; corolla pale blue. — River-banks and shores near the sea, Md. to Tex.

## 11. LIMOSÉLLA, L. MUDWORT.

Calyx bell-shaped, 5-toothed. Corolla short, widely bell-shaped, 5-cleft, nearly regular. Stamens 4; anthers confluently 1-celled. Style short, club-shaped. Capsule globular, many-seeded; the partition thin and vanishing. — Small annuals, growing in mud, usually near the sea-shore, creeping by slender runners, without ascending stems; the entire fleshy leaves in dense clusters around the simple 1-flowered naked peduncles. Flowers small, white or purplish. (Name from *limus,* mud, and *sella,* seat.)

1. **L. aquática,** L., var. **tenuifòlia,** Hoffm. Leaves (with no blade distinct from the petiole) awl-shaped or thread-form. — Brackish river-banks and shores, Lab. to N. J., and far north and west. (Eu., Asia, etc.)

## 12. GRATÌOLA, L. HEDGE-HYSSOP.

Calyx 5-parted, the narrow divisions nearly equal. Upper lip of corolla entire or 2-cleft, the lower 3-cleft. Fertile stamens 2, included, posterior; the anterior mere sterile filaments, or wanting. Style dilated or 2-lipped at the apex. Capsule 4-valved, many-seeded. — Low herbs, mostly perennials, some apparently annuals, with opposite sessile leaves, and axillary 1-flowered peduncles, usually with 2 bractlets at the base of the calyx. Flowering all summer; all inhabiting wet or damp places. (Name from *gratia,* grace or favor, on account of supposed excellent medicinal properties.)

§ 1. *Anthers with a broad connective, the cells transverse; stems mostly diffusely branched, or creeping at base, soft viscid-pubescent or smooth; corollas* 4 – 6″ *long; bractlets foliaceous, equalling the calyx.*

* *Sterile filaments minute or none; corolla whitish, with the tube yellowish.*

1. **G. Virginiàna,** L. Stem clammy-puberulent above (4 – 6′ high); leaves lanceolate with narrow base, acute, entire or sparingly toothed; *peduncles almost equalling the leaves* (½ – 1′ long); pod ovoid (2″ long). — Very common.

2. **G. sphærocárpa,** Ell. Smooth, rather stout (5 – 10′ high); leaves lance-ovate or oblong to oval-obovate (1 – 2′ long), toothed; *peduncles scarcely longer than the calyx* and the large (3″) globular pod. — N. J. and Md. to Ill., south to Fla. and Tex.

* * *Sterile filaments slender, tipped with a little head; leaves short (½ – 1′ long).*

3. **G. viscòsa,** Schwein. *Clammy-pubescent or glandular; leaves ovate-lanceolate or oblong,* acute, toothed, mostly shorter than the peduncles; *corolla whitish, yellow within.* — Ky. to N. C. and Ga.

4. **G. aùrea,** Muhl. *Nearly glabrous; leaves lanceolate or oblong-linear, entire,* equalling the peduncles; *corolla golden-yellow* (½′ long). — Sandy swamps, Vt. and N. H. to Ohio, and south to Fla.

§ 2. *Anthers with no broad connective, the cells vertical; sterile filaments tipped with a head; hairy apparently annual plants, with erect rigid and more simple stems.*

5. **G. pilòsa,** Michx. Leaves ovate or oblong, sparingly toothed, sessile (½′ long); flowers nearly sessile; corolla white, 3 – 4″ long, scarcely exceeding the calyx. — Low ground, N. J. to Fla. and Tex.

## 13. ILYSÁNTHES, Raf.

Calyx 5-parted, nearly equal. Upper lip of corolla short, erect, 2-lobed; the lower larger and spreading, 3-cleft. Fertile stamens 2, included, posterior; the anterior pair sterile, inserted in the throat, 2-lobed, without anthers; one of the lobes glandular, the other smooth, usually short and tooth-like. Stigma 2 lobed. Capsule ovate or oblong, many-seeded. — Small and smooth annuals, with opposite leaves, and small axillary (purplish) flowers, on filiform naked pedicels, or the upper racemed, produced all summer. (Name from ἰλύς, *mud*, or *mire*, and ἄνθος *flower*.)

1. **I. ripària,** Raf. (False Pimpernel.) Much branched, diffusely spreading (4 – 8′ high), or at first simple and erect, leafy; leaves ovate, rounded, or oblong, sparingly toothed or entire, the upper partly clasping; corolla 3″ long. (I. gratioloides, *Benth.*) — Wet places; common.

## 14. MICRÁNTHEMUM, Michx.

Calyx 4-lobed or 4- (rarely 5-) parted. Corolla short, 2-lipped, with the upper lip considerably shorter than the lower, or 1-lipped, the upper lip obsolete; lower lip 3-cleft, the middle lobe longest. Stamens 2, anterior, the short filaments with a glandular (mostly basal) appendage; anthers 2-celled, didymous; no sterile filaments. Style short; the stigma 2-lobed. Capsule globular, thin, with a very delicate or evanescent partition, several – many-seeded. — Small, smooth, depressed and tufted or creeping annuals, in mud or shallow water, with opposite and entire rounded or spatulate sessile leaves, and minute white or purplish flowers solitary in the axils of some of the middle leaves (usually one axil floriferous, that of the other leaf sterile). (Name formed of μικρὸς, *small*, and ἄνθεμον, *flower*.)

1. **M. Nuttàllii,** Gray. Branches ascending, 1 – 2′ high; leaves obovate-spatulate or oval; peduncles at length recurved, about the length of the calyx, which is bell-shaped, 4-toothed and usually split down on one side, in fruit becoming pear-shaped; middle lobe of the corolla linear-oblong, nearly twice the length of the lateral ones; appendage of the stamen nearly as long as the filament itself; stigmas subulate. — Tidal mud of rivers, N. J. to Fla. Aug. – Oct.

## 15. SÝNTHYRIS, Benth.

Calyx 4-parted. Corolla somewhat bell-shaped, variously 2–4-lobed or cleft. Stamens 2, inserted just below the upper sinuses, occasionally with another pair from the other sinuses, exserted; anther-cells not confluent. Style slender; stigma simple. Capsule flattened, rounded, obtuse or notched, 2-celled (rarely 3-lobed and 3-celled), many-seeded, loculicidal; the valves cohering below with the axis. — Perennial herbs, with the simple stems beset with partly clasping bract-like alternate leaves, the root-leaves rounded and petioled, crenate. Flowers in a raceme or spike, bracteate. (Name from *σύν, together,* and *θυρίς, a little door;* in allusion to the closed valves of the pod.)

1. **S. Houghtoniàna,** Benth. Hairy; root-leaves ovate, heart-shaped; spike dense (5–12′ long); corolla (greenish-white or yellowish) not longer than the calyx, usually 2–3-parted. — Oak-barrens and prairies, Mich. to Minn., south to Ind., Ill., and Iowa.

## 16. VERÓNICA, L. SPEEDWELL.

Calyx 4- (rarely 3–5-) parted. Corolla wheel-shaped or salver-shaped, the border 4-parted (rarely 5-parted); the lateral lobes or the lower one commonly narrower than the others. Stamens 2, one each side of the upper lobe of the corolla, exserted; anther-cells confluent at the apex. Style entire; stigma single. Capsule flattened, obtuse or notched at the apex, 2-celled, few–many-seeded. — Chiefly herbs; leaves mostly opposite or whorled; flowers blue, flesh-color, or white. (Derivation doubtful; perhaps the flower of *St. Veronica.*)

§ 1. LEPTÁNDRA. *Tall perennials, with mostly whorled leaves; racemes terminal, dense, spiked; bracts very small; tube of the corolla longer than its limb and much longer than the calyx; both sometimes 5-cleft.*

1. **V. Virgínica,** L. (CULVER'S-ROOT. CULVER'S PHYSIC.) Smooth or rather downy; stem simple, straight (2–6° high); leaves whorled in fours to sevens, short-petioled, lanceolate, pointed, finely serrate; spikes panicled; corolla small, nearly white; stamens much exserted; capsule oblong-ovate, not notched, opening by 4 teeth at the apex, many-seeded. — Rich woods, Vt. to Minn., E. Kan., and southward. July, Aug.

§ 2. VERONICA proper. *Corolla wheel-shaped; capsule more or less notched, strongly flattened except in* n. 2 *and* 3; *low herbs.*

* *Perennials, stoloniferous or rooting at base, with opposite usually serrate leaves; racemes axillary, mostly opposite; corolla pale blue.*

+- *Capsule turgid, orbicular, many-seeded.*

2. **V. Anagállis,** L. (WATER SPEEDWELL.) Smooth, creeping and rooting at base, then erect; *leaves sessile, most of them clasping by a heart-shaped base, ovate-lanceolate,* acute, serrate or entire (2–3′ long); pedicels spreading; corolla pale blue with purple stripes; capsule slightly notched. — Brooks and ditches, N. Eng. to N. J., west to the Rocky Mts. June–Aug. (Eu., Asia.)

3. **V. Americàna,** Schweinitz. (AMERICAN BROOKLIME.) Smooth, decumbent at base, then erect (8–15′ high); *leaves mostly petioled, ovate or oblong,* serrate, thickish, truncate or slightly heart-shaped at base; the slender pedicels spreading. — Brooks and ditches, common. June–Aug.

+ + *Capsule strongly flattened, several-seeded.*

4. **V. scutellàta,** L. (Marsh Speedwell.) *Smooth*, slender and weak (6–12′ high); *leaves sessile, linear, acute, remotely denticulate; racemes several, very slender* and zigzag; *flowers few and scattered*, on elongated spreading or reflexed pedicels; capsule very flat, much broader than long, notched at both ends or didymous. — Bogs, common. June–Aug. (Eu., Asia.)

5. **V. officinàlis,** L. (Common Speedwell.) *Pubescent;* stem *prostrate*, rooting at base; *leaves short-petioled, obovate-elliptical or wedge-oblong, obtuse, serrate; racemes densely many-flowered;* pedicels shorter than the calyx; capsule obovate-triangular, broadly notched. — Dry hills and open woods, N. Eng. to Mich., and southward. July. (Eu., Asia.)

**V.** Chamæ̀drys, L. Stem *pubescent*, at least in two lines, ascending from a creeping base; *leaves subsessile, ovate or cordate, incisely crenate; racemes loosely-flowered;* pedicels little longer than calyx; capsule triangular-obcordate. — Sparingly introduced into Canada, N. Y., and Penn. (Adv. from Eu.)

* * *Leaves opposite; flowers in a terminal raceme; the lower bracts leaf-like; capsules flat, several-seeded. Perennials (mostly turning blackish in drying).*

6. **V. alpìna,** L. Stem branched from the base, erect, simple (2–12′ high); *leaves elliptical*, or the lowest rounded, entire or toothed, *nearly sessile; raceme hairy, few-flowered, crowded;* capsule obovate, notched. — Alpine summits of the White Mts. (Eu., Asia.)

7. **V. serpyllifòlia,** L. (Thyme-leaved Speedwell.) Much branched at the creeping base, *nearly smooth;* branches ascending and simple (2–4′ high); *leaves ovate or oblong*, obscurely crenate, *the lowest petioled* and rounded, the upper passing into lanceolate bracts; *raceme loose;* corolla whitish, or pale blue, with deeper stripes; capsule rounded, broader than long, obtusely notched. — Roadsides and fields, common; introduced and indigenous. May–July (Eu., Asia.)

* * * *Annuals; floral leaves like those of the stem (or somewhat reduced), the flowers appearing to be axillary and solitary, mostly alternate; corolla shorter than the calyx.*

+ *Flowers short-pedicelled; floral leaves reduced; corolla shorter than the calyx.*

8. **V. peregrìna,** L. (Neckweed. Purslane Speedwell.) Glandular-puberulent or *nearly smooth*, erect (4–9′ high), branched; *lowest leaves petioled, oval-oblong, toothed*, thickish, the others sessile, obtuse; the upper oblong-linear and entire, longer than the almost sessile (whitish) flowers; *capsule orbicular, slightly notched*, many-seeded. — Waste and cultivated grounds, in damp soil; throughout U. S., and almost cosmopolite. April–June.

**V.** arvénsis, L. (Corn Speedwell.) Simple or diffusely branched (3–8′ high), *hairy; lower leaves petioled, ovate, crenate;* the uppermost sessile, lanceolate, entire; *capsule inversely heart-shaped*, the lobes rounded. — Cultivated grounds, Atlantic States to Tex., rather rare. (Nat. from Eu.)

+ + *Flowers long-pedicelled in axils of ordinary leaves; seeds cup-shaped.*

**V.** agréstis, L. (Field Speedwell.) *Leaves* round or ovate, crenate-toothed, the floral somewhat similar; calyx-lobes oblong; flower small; *ovary many-ovuled*, but the *nearly orbicular and sharply notched capsule* 1–2-seeded. — Sandy fields, N. Brunswick to La., near the coast. (Adv. from Eu.)

**V.** Buxbaùmii, Tenore. *Leaves* round or heart-ovate, crenately cut-toothed (⅔–1′ long); flower large (nearly ½′ wide, blue); calyx-lobes lanceolate, widely spreading in fruit; *capsule obcordate-triangular, broadly notched*, 16–24-seeded. — Waste grounds, rare in Atlantic States. (Adv. from Eu.)

V. HEDERÆFÒLIA, L. (IVY-LEAVED SPEEDWELL.) *Leaves* rounded or heart-shaped, 3–7-*toothed or lobed;* calyx-lobes somewhat heart-shaped; flowers small; *capsule turgid*, 2-*lobed*, 2–4-*seeded*. — Shaded places, N. J., Penn., etc. April–June. (Adv. from Eu.)

## 17. BÚCHNERA, L. BLUE-HEARTS.

Calyx tubular, obscurely nerved, 5-toothed. Corolla salver-form, with a straight or curved tube and an almost equally 5-cleft limb, the lobes oblong or wedge-obovate, flat. Stamens 4, included, approximate in pairs; anthers one-celled (the other cell wanting). Style club-shaped and entire. Capsule 2-valved, many-seeded.—Perennial rough-hairy herbs (doubtless root-parasitic), turning blackish in drying, with opposite leaves, or the uppermost alternate; the flowers opposite in a terminal spike, bracted and with 2 bractlets. (Named in honor of *I. G. Buchner*, an early German botanist.)

1. **B. Americàna,** L. Rough-hairy; stem wand-like (1–2° high); lower leaves obovate-oblong, the others ovate-oblong to linear-lanceolate, sparingly and coarsely toothed, veiny; spike interrupted; calyx longer than the bracts, one third the length of the deep-purple corolla (1′ long). — Moist sandy ground, western N. Y. to Minn., and southward. June–Aug.

## 18. SEYMÈRIA, Pursh.

Calyx bell-shaped, deeply 5-cleft. Corolla with a short and broad tube, not longer than the 5 ovate or oblong nearly equal and spreading lobes. Stamens 4, somewhat equal; anthers approximate by pairs, oblong, 2-celled; the cells equal and pointless. Capsule many-seeded. — Erect branching herbs, with the general aspect and character of Gerardia; leaves mostly opposite and dissected or pinnatifid, the uppermost alternate and bract-like. Flowers yellow, interruptedly racemed or spiked. (Named for *Henry Seymer*, an English naturalist.)

1. **S. macrophýlla,** Nutt. (MULLEIN-FOXGLOVE.) Rather pubescent (4–5° high); leaves large, the lower pinnately divided, with the broadly lanceolate divisions pinnatifid and incised, the upper lanceolate; tube of the corolla incurved, very woolly inside, as are the filaments except at the apex; style short, dilated and notched at the point; capsule ovate, pointed. — Shady river-banks, Ohio to Iowa, south to Tex. July.

## 19. GERÁRDIA, L.

Calyx bell-shaped, 5-toothed or 5-cleft. Corolla campanulate-funnel-form, or somewhat tubular, swelling above, with 5 more or less unequal spreading lobes, the 2 upper usually rather smaller and more united. Stamens 4, strongly didynamous, included, hairy; anthers approaching by pairs, 2-celled, the cells parallel, often pointed at base. Style elongated, mostly enlarged and flattened at the apex. Capsule globular or ovate, pointed, many-seeded. — Erect branching herbs (more or less root-parasitic); stem-leaves opposite, or the upper alternate, the uppermost reduced to bracts and subtending 1 flowered peduncles, which often form a raceme or spike. Flowers showy, purple or yellow; in late summer and autumn. (Dedicated to the celebrated herbalist, *John Gerarde*.)

§ 1. DASÝSTOMA. *Corolla yellow, the tube woolly inside, as well as the anthers and filaments; anthers alike, awn-pointed at base; leaves rather large, more or less incised or pinnatifid.*

* *Pubescence partly glandular and viscid; corolla pubescent outside.*

1. **G. pediculària,** L. Annual or biennial, smoothish or pubescent, much branched (2–3° high), very leafy; leaves ovate-lanceolate, pinnatifid, and the lobes cut and toothed; pedicels longer than the hairy mostly serrate calyx-lobes. — Dry copses; N. Eng. to Minn., south to Fla. and Ark.

* * *No glandular pubescence; corolla glabrous outside; perennial.*

2. **G. grandiflòra,** Benth. *Minutely downy;* stem much branched (2–4° high); *leaves ovate-lanceolate, coarsely toothed or cut, the lower pinnatifid;* pedicels rather shorter than the calyx; corolla (2′ long) 4 times the length of the broadly lanceolate entire or toothed calyx-lobes. — Oak openings, Wisc. and Minn. to Tenn. and Tex.

3. **G. flàva,** L. (Downy False Foxglove.) *Pubescent with a fine close down;* stem (3–4° high) mostly simple; *leaves ovate-lanceolate or oblong, obtuse, entire, or the lower usually sinuate-toothed or pinnatifid; pedicels very short;* calyx-lobes oblong, obtuse, rather shorter than the tube, corolla 1½′ long. — Open woods, N. Eng. to Wisc. and Iowa, south to Ga. and Ark.

4. **G. quercifòlia,** Pursh. (Smooth False Foxglove.) *Smooth and glaucous* (3–6° high), usually branching; lower *leaves commonly twice-pinnatifid; the upper oblong-lanceolate, pinnatifid or entire; pedicels nearly as long as the calyx;* calyx-lobes lance-linear, acute, as long as the at length inflated tube; corolla 2′ long. — Dry woods, N. Eng. to Minn., south to Fla. and Ill.

5. **G. lævigàta,** Raf. *Smooth, not glaucous;* stem (1–2° high) mostly simple; *leaves lanceolate, acute, entire,* or the lowest obscurely toothed; *pedicels shorter than the calyx-tube;* corolla 1′ long. (G. integrifolia, *Gray.*) — Oak-barrens, etc., Penn. to Mich. and Ill., south in the mountains to Ga.

§ 2. OTOPHÝLLA. *Corolla purple (rarely white), naked within, as well as the very unequal filaments; anthers dissimilar, pointless, glabrous or sparingly hairy.*

6. **G. auriculàta,** Michx. Rough-hairy; stem erect, nearly simple (9–20′ high); *leaves lanceolate or ovate-lanceolate,* sessile, *the lower entire,* the others with an oblong-lanceolate lobe on each side at the base; *flowers nearly sessile in the axils* (1′ long). — Low grounds and prairies, W. Penn. to Minn., south to N. C. and Mo.

7. **G. densiflòra,** Benth. More hispid and rough, very leafy; *leaves rigid, pinnately parted into 3–7 narrowly linear acute divisions,* those subtending the *densely spicate flowers* similar and crowded; corolla over 1′ long. — Prairies, E. Kan. to Tex.

§ 3. GERARDIA proper. *Corolla purple or rose-color (rarely white); calyx-teeth short; anthers alike, nearly pointless, pubescent; cauline leaves linear or narrower, entire.*

* *Perennial; leaves erect, very narrow; pedicels erect, as long as floral leaves.*

8. **G. linifòlia,** Nutt. Glabrous, 2–3° high, sparingly or paniculately branched; leaves flat, thickish, 1″ wide; calyx-teeth minute; corolla 1′ long.

minutely pubescent outside, villous within and lobes ciliate; anthers and filaments very villous. — Low pine barrens, Del. to Fla.

* * *Annuals; herbage blackish in drying* (except n. 13).

+ *Pedicels little if at all longer than the calyx and capsule.*

9. **G. áspera,** Dougl. Sparingly branched (1–2° high); leaves long and linear, rough; *pedicels* (*most of them alternate*) *equalling or moderately exceeding the calyx,* which has *triangular-lanceolate acute lobes about half as long as the tube;* corolla over 1′ long. — Plains and prairies, Mich. and W. Ind. to Dak. and W. Ark.

10. **G. purpùrea,** L. (PURPLE GERARDIA.) Stem (1–2° high) with long and rigid widely spreading branches; *leaves linear, acute, rough-margined;* flowers large (1′ long), bright purple, often downy; *pedicels shorter than the calyx, mainly opposite; calyx-teeth sharp-pointed,* from very short to about half as long as the tube. — Low grounds, mainly near the coast and in the region of the Great Lakes. Very variable. — Var. PAUPÉRCULA, Gray. Smoother, more simple; corolla usually only $\frac{1}{2}$′ long, lighter rose-purple. — N. Eng. to Penn., N. Ill., Minn., and northward.

11. **G. marítima,** Raf. (SEA-SIDE G.) Low (4–12′ high), with shorter branches; *leaves and short broad calyx-teeth rather fleshy and obtuse;* pedicels about as long as the calyx; corolla $\frac{1}{2}$′ long. — Salt marshes along the coast.

+ + *Pedicels usually exceeding the corolla; woolly anthers cuspidate at base.*

12. **G. tenuifòlia,** Vahl. (SLENDER G.) *Leaves narrowly linear,* acute, the floral ones mostly like the others; *calyx-teeth very short, acute; capsule globular, not exceeding the calyx;* corolla about $\frac{1}{2}$′ long. — Low or dry ground, common. — Var. MACROPHÝLLA, Benth. Stouter; larger leaves $1\frac{1}{2}$–2′ long and almost 2″ wide, scabrous; pedicels ascending; calyx-teeth larger; corolla little over $\frac{1}{2}$′ long. W. Iowa to W. La. and Col. — Var. ASPÉRULA, Gray. Leaves all nearly filiform and upper face hispidulous scabrous; inflorescence more paniculate; corolla small, the expanded limb only 6″ in diameter. Dry bare hills, Mich. and N. Ind. to Minn. and Mo.

13. **G. Skinneriàna,** Wood. *Leaves bristle-shaped,* as are the branchlets, or the lower linear; *capsule ovate, mostly longer than the calyx,* which has short setaceous teeth; corolla 4–6″ long. (G. setacea, *Gray,* Man., not of *Walt.*) — Sandy low ground, Mass. to Minn., south to Fla. and La.

## 20. CASTILLÈIA, Mutis. PAINTED-CUP.

Calyx tubular, flattened, cleft at the summit on the anterior, and usually on the posterior side also; the divisions entire or 2-lobed. Tube of the corolla included in the calyx; its upper lip (*galea*) long and narrow, arched and keeled, flattened laterally, enclosing the 4 unequal stamens; lower lip short, 3-lobed. Anther-cells oblong-linear, unequal, the outer fixed by the middle, the inner pendulous. Capsule many-seeded. — Herbs (root-parasitic), with alternate entire or cut-lobed leaves; the floral ones usually dilated, colored, and more showy than the yellow or purplish spiked flowers. (Dedicated to *Castillejo,* a Spanish botanist.)

1. **C. coccínea,** Spreng. (SCARLET PAINTED-CUP.) Hairy biennial or annual; stem simple; root-leaves clustered, mostly entire, obovate or

oblong; those of the stem incised; the floral 3 – 5-cleft, bright scarlet toward the summit (rarely yellow); calyx about the length of the pale yellow corolla, *equally cleft both sides, the lobes quadrate-oblong, entire or retuse.* — Low sandy ground, Maine to Minn., south to N. J., Tenn., and Tex.

2. **C. pállida**, Kunth, var. **septentrionàlis**, Gray. Perennial, smooth or sparingly hairy, at the summit woolly; *leaves mainly entire*, the lower linear, upper broader; the floral oblong or obovate, greenish-white, varying to yellowish, purple, or red; *calyx equally cleft, the lobes oblong or lanceolate, 2-cleft;* corolla ½ – 1′ long, the *galea decidedly shorter than the tube*, not over 2 or 3 times as long as the lip. — Alpine summits of N. Eng., N. shore of L. Superior, west and northward.

3. **C. sessiliflòra**, Pursh. Perennial, 6 – 8′ high, very leafy, cinereous-pubescent; leaves mostly 3 – 5-cleft, with narrow diverging sometimes cleft lobes; the floral similar or broader, *not at all colored; calyx deeper cleft in front*, the narrow lobes deeply 2-cleft; corolla 2′ long, *the short galea but twice as long as the slender-lobed lip.* — Prairies, Wisc. and Ill. to Dak. and Tex.

## 21. ORTHOCÁRPUS, Nutt.

Corolla with the upper lip (*galea*) little longer and usually much narrower than the inflated 1 – 3-saccate lower one. Otherwise nearly as Castilleia. (Name from ὀρθός, *upright*, and καρπός, *fruit*.)

1. **O. lùteus**, Nutt. Annual, pubescent and hirsute, sometimes viscid, erect, 1° high; leaves linear to lanceolate, occasionally 3-cleft; spike dense; bracts broader, mostly 3-cleft, about equalling the flowers, not colored; corolla golden-yellow, not 6″ long, 2 – 3 times as long as the calyx. — Plains, N. Minn. to Col., and westward.

## 22. SCHWÁLBEA, Gronov. Chaff-seed.

Calyx oblique, tubular, 10 – 12-ribbed, 5-toothed; the posterior tooth much the smaller, the 2 anterior united higher than the others. Upper lip of the corolla arched, oblong, entire; the lower little shorter, erect, 2-plaited, with 3 very short and broad obtuse lobes. Stamens 4, included in the upper lip; anther-cells equal and parallel. Capsule ovate, many-seeded. Seeds linear, with a loose chaff-like coat. — A perennial minutely pubescent upright herb (1 – 2° high), with leafy simple stems, terminated by a loose spike of rather large dull purplish-yellow flowers; leaves alternate, sessile, 3-nerved, entire, ovate or oblong, the upper gradually reduced to narrow bracts; pedicels very short, with 2 bractlets under the calyx. (Dedicated to *C. G. Schwalbe*, an obscure German botanist.)

1. **S. Americàna**, L. — Wet sandy soil, Mass. to La., near the coast. May – July.

## 23. EUPHRÀSIA, Tourn. Eyebright.

Calyx tubular or bell-shaped, 4-cleft. Upper lip of the corolla erect, scarcely arched, 2-lobed, and the sides folded back; lower lip spreading, 3-cleft, the lobes obtuse or notched. Stamens 4, under the upper lip; anther-cells equal, pointed at the base. Capsule oblong, flattened. Seeds numerous. — Herbs, with branching stems, and opposite toothed or cut leaves. Flowers, small, spiked. (Name εὐφρασία, *cheerfulness*, in allusion to its reputed medicinal properties.)

1. **E. officinàlis,** L. Low annual; leaves ovate or lanceolate, the lowest crenate, the floral bristly-toothed; lobes of the lower lip of the (whitish, yellowish, or bluish) corolla notched. — Coast of Maine and Lower Canada; perhaps introduced from Eu. — Var. TATÁRICA, Benth., a low form with small flowers (2 - 3″ long), and mostly rounded leaves. — Alpine region of N. H., shore of L. Superior, and far northward.

## 24. BÁRTSIA, L.

Calyx equally 4-cleft. Corolla with upper lip entire and sides not folded back. Otherwise much as Euphrasia. — Herbs, with opposite sessile leaves, and subsessile flowers, in the upper axils and in a terminal leafy spike.

**B.** ODONTÌTES, Huds. A span or two high from an annual root, branching, scabrous-pubescent; leaves oblong-lanceolate, coarsely and remotely serrate; spikes elongated, loosely-flowered; corolla small, rose-red. — Coast of Maine and N. Scotia. (Nat. from Eu.)

## 25. RHINÁNTHUS, L. YELLOW-RATTLE.

Calyx membranaceous, flattened, much inflated in fruit, 4-toothed. Upper lip of corolla arched, ovate, obtuse, flattened, entire at the summit, but with a minute tooth on each side below the apex; lower lip 3-lobed. Stamens 4, under the upper lip; anthers approximate, hairy, transverse; the cells equal, pointless Capsule orbicular, flattened. Seeds many, orbicular, winged. — Annual upright herbs, with opposite leaves; the yellow flowers crowded in a one-sided leafy-bracted spike. (Name composed of ῥίν, *a snout*, and ἄνθος, *a flower*, from the beaked upper lip in some species formerly of this genus.)

1. **R. Crista-gálli,** L. Leaves narrowly oblong to lanceolate, coarsely serrate, the floral bracts more incised with bristle-tipped teeth; corolla 6″ long; seeds broadly winged (when ripe they rattle in the inflated calyx, whence the popular name.) — Coast of N. Eng. and alpine region of N. H., to L. Superior, and northward. (Eu., Asia.)

## 26. PEDICULÀRIS, Tourn. LOUSEWORT.

Calyx various. Corolla strongly 2-lipped; the upper lip arched, flattened, often beaked at the apex; the lower erect at base, 2-crested above, 3-lobed; lobes commonly spreading, the lateral ones rounded and larger. Stamens 4, under the upper lip; anthers transverse; the cells equal, pointless. Capsule ovate or lanceolate, mostly oblique, several-seeded. — Perennial herbs, with chiefly pinnatifid leaves, the floral bract-like, and rather large flowers in a spike. (Name from *pediculus*, a louse; of no obvious application.)

1. **P. Canadénsis,** L. (COMMON LOUSEWORT. WOOD BETONY.) Hairy; stems simple, clustered (5 - 12′ high); *leaves scattered, the lowest pinnately parted, the others half-pinnatifid;* spike short and dense; *calyx split in front, otherwise almost entire,* oblique; *upper lip of the* (dull greenish-yellow and purplish) *corolla hooded, incurved,* 2-toothed under the apex; capsule *flat, somewhat sword-shaped.* — Copses and banks, common. May - July.

2. **P. lanceolàta,** Michx. Stem upright (1–3° high), nearly simple, mostly smooth; *leaves partly opposite, oblong-lanceolate, doubly cut-toothed;* spike crowded; *calyx 2-lobed,* leafy-crested; *upper lip of the* (pale yellow) *corolla incurved* and bearing a short truncate beak at the apex, the lower erect, so as nearly to close the throat; *capsule ovate, scarcely longer than the calyx.* — Swamps, Conn. to Va., Ohio, and Minn.

3. **P. Furbíshiæ,** Watson. Tall (2–3° high) pubescent or glabrate; leaves lanceolate, *pinnately parted and the short oblong divisions pinnatifid-incised,* or the upper simply pinnatifid and the lobes serrate; bracts ovate, laciniate-dentate; *calyx-lobes* 5, rather unequal, linear-lanceolate, entire or toothed; *upper lip of corolla straight* and beakless, the truncate apex bicuspidate, the lower erect, truncately 3-lobed; *capsule broadly ovate.* — Banks of the St. John's, Aroostook Co., Maine (*Miss Kate Furbish*), and adjacent N. Brunswick.

### 27. MELAMPȲRUM, Tourn. Cow-Wheat.

Calyx bell shaped, 4-cleft; the taper lobes sharp-pointed. Tube of corolla cylindrical, enlarging above; upper lip arched, compressed, straight in front; the lower erect-spreading, biconvex, 3-lobed at the apex. Stamens 4, under the upper lip; anthers approximate, oblong, nearly vertical, hairy; the equal cells minutely pointed at base. Ovary with 2 ovules in each cell. Capsule flattened, oblique, 1–4-seeded. — Erect branching annuals, with opposite leaves, the lower entire, the upper mostly toothed at base. Flowers solitary in the upper axils. (Name from *μέλας, black,* and *πυρὸς, wheat;* from the color of the seeds of some species as they appear mixed with grain.)

1. **M. Americànum,** Michx. Leaves lanceolate, short-petioled, the floral ones like the lower, or truncate at base and beset with a few bristly teeth; calyx-teeth linear-awl-shaped, not half the length of the slender tube of the pale greenish-yellow corolla (5″ long). — Open woods; common, from the Atlantic to Minn. and Iowa, especially eastward. June–Sept.

## Order 76. OROBANCHÀCEÆ. (Broom-rape Family.)

*Herbs destitute of green foliage (root-parasites), monopetalous, didynamous, the ovary one-celled with 2 or 4 parietal placentæ: pod very many-seeded; seeds minute, with albumen and a very minute embryo.* — Calyx persistent, 4–5-toothed or parted. Corolla tubular, more or less 2-lipped, ringent, persistent and withering; upper lip entire or 2-lobed, the lower 3-lobed. Stamens 4, didynamous, inserted on the tube of the corolla; anthers 2-celled, persistent. Ovary free, ovoid, pointed with a long style; stigma large. Capsule 1-celled, 2-valved; each valve bearing on its face one placenta or a pair. Seeds very numerous, minute. — Low, thick or fleshy herbs, bearing scales in place of leaves, lurid yellowish or brownish throughout. Flowers solitary or spiked.

* Flowers of two sorts, scattered along slender panicled branches.

1. **Epiphegus.** Upper flowers sterile, with a tubular corolla; the lower fertile, with the corolla minute and not expanding. Bracts inconspicuous.

* * Flowers all alike and perfect; stems mostly simple.

2. **Conopholis.** Flowers densely spicate. Calyx deeply cleft in front. Corolla 2-lipped. Stamens exserted.
3. **Aphyllon.** Flowers pedicellate, sometimes subsessile and thyrsoid-spicate. Calyx regularly 5-cleft. Corolla somewhat 2-lipped. Stamens included.
4. **Orobanche.** Flowers sessile, spicate. Calyx cleft before and behind almost to the base. Corolla 2-lipped. Stamens included.

### 1. EPIPHÈGUS, Nutt. BEECH-DROPS. CANCER-ROOT.

Flowers racemose or spiked, scattered on the branches; the upper sterile, with a long tubular corolla and long filaments and style; the lower fertile, with a very short corolla which seldom opens, but is forced off from the base by the growth of the pod; stamens and style very short. Calyx 5-toothed. Stigma capitate, a little 2-lobed. Capsule 2-valved at the apex, with 2 approximate placentæ on each valve. — Herbs slender, purplish or yellowish-brown, much branched, with small scattered scales, 6 - 12′ high. (Name from ἐπί, *upon*, and φηγός, *the Beech*, because it grows on the roots of that tree.)

1. **E. Virginiàna,** Bart. Corolla of the upper (sterile) flowers whitish and purple, 6 – 8″ long, curved, 4-toothed. — Common under Beech-trees, parasitic on their roots; N. Brunswick to Wisc., south to Fla. and Ark. Aug. – Oct.

### 2. CONÓPHOLIS, Wallroth. SQUAW-ROOT. CANCER-ROOT.

Flowers in a thick scaly spike, perfect, with 2 bractlets at the base of the irregularly 4 – 5-toothed calyx; its tube split down on the lower side. Corolla tubular, swollen at base, strongly 2-lipped; upper lip arched, notched at the summit, the lower shorter, 3-parted, spreading. Stamens protruded. Stigma depressed. Capsule with 4 placentæ, a pair on the middle of each valve. — Upper scales forming bracts to the flowers, regularly imbricate, not unlike those of a fir-cone (whence the name, from κῶνος, *a cone*, and φολίς, *a scale*).

1. **C. Americàna,** Wallroth. — Oak woods, growing in clusters among fallen leaves; N. Eng. to Mich., south to Fla. and Tenn. May, June. — A singular plant, chestnut-colored or yellowish throughout, as thick as a man's thumb, 3 – 6′ high, covered with fleshy scales, which become dry and hard.

### 3. APHÝLLON, Mitchell. NAKED BROOM-RAPE.

Flowers perfect, pedicellate, sometimes subsessile and thyrsoid-spicate. Calyx 5-cleft, regular. Corolla somewhat 2-lipped; the upper lip more or less spreading and 2-lobed, the lower spreading, 3-lobed. Stamens included. Stigma broadly 2-lipped or crateriform. Capsule with 4 placentæ, equidistant or contiguous in pairs. Plants brownish or whitish. Flowers (purplish or yellowish) and naked scapes minutely glandular-pubescent. (Name from α- privative and φύλλον, *foliage*, alluding to the naked stalks.)

* *Flowers solitary on long naked scapes or peduncles, without bractlets; corolla with a long curved tube and spreading* 5-*lobed limb.*

1. **A. unifiòrum,** Gray. (ONE-FLOWERED CANCER-ROOT.) *Stem subterranean or nearly so, very short,* scaly, often branched, each branch sending up 1 – 3 slender one-flowered scapes (3 – 5′ high); *divisions of the calyx lance-awl-shaped,* half the length of the corolla, which is 1′ long, with 2 yellow

bearded folds in the throat, and obovate lobes. — Damp woodlands, Newf. to Va. and Tex., and west to the Pacific. April – July.

2. **A. fasciculàtum**, Gray. *Scaly stem erect and rising* 3 – 4′ *out of the ground*, mostly longer than the crowded peduncles; *divisions of the calyx triangular, very much shorter than the corolla*, which has rounded short lobes. — Sandy ground, L. Michigan to Minn., southward west of the Mississippi, and westward. On Artemisia, Eriogonum, etc. May.

* * *Caulescent; flowers densely spicate, with* 1 – 2 *bractlets at base of calyx; corolla* 2-*lipped, the upper lip less or not at all* 2-*cleft.*

3. **A. Ludoviciànum**, Gray. Glandular-pubescent, branched (3 – 12′ high); corolla somewhat curved, twice the length of the narrow lanceolate calyx-lobes; the lips equal in length. (Phelipæa Ludoviciana, *Walp.*) — Minn. to Ill. and Tex., and westward.

### 4. OROBÁNCHE, Tourn. BROOM-RAPE.

Flowers spicate, sessile. Calyx cleft before and behind almost or quite to the base, the divisions usually 2-cleft. Corolla 2-lipped; upper lip erect, 2-lobed or emarginate, the lower spreading, broadly 3-lobed. Stamens included. — Old World parasites, on roots of various plants.

**O.** MÌNOR, L. A span to a foot high, pubescent, pale yellowish-brown, or with purplish-tinged flowers in a rather loose spike; corolla 6″ long. — Parasitic on clover, N. J. to Va. Sparingly and probably recently introduced.

## ORDER 77. LENTIBULARIÀCEÆ. (BLADDERWORT FAMILY.)

*Small herbs (growing in water or wet places), with a 2-lipped calyx, and a 2-lipped personate corolla, 2 stamens with (confluently) one-celled anthers, and a one-celled ovary with a free central placenta, bearing several anatropous seeds, with a thick straight embryo, and no albumen.* — Corolla deeply 2-lipped, the lower lip larger, 3-lobed and with a prominent palate, spurred at the base in front; the palate usually bearded. Ovary free; style very short or none; stigma 1 – 2-lipped. Capsule often bursting irregularly. Scapes 1 – few-flowered. — The following are the two principal genera.

1. **Utricularia.** Calyx-lobes mostly entire. Upper lip of corolla erect. Filaments strongly incurved. Foliage dissected; bladder-bearing.
2. **Pinguicula.** Calyx with upper lip deeply 3- and lower 2-cleft. Corolla-lobes spreading. Filaments straighter. Terrestrial, with entire rosulate leaves next the ground.

### 1. UTRICULÀRIA, L. BLADDERWORT.

Lips of the 2-parted calyx entire, or nearly so. Corolla personate, the palate on the lower lip projecting, often closing the throat; upper lip erect. Anthers convergent. — Aquatic and immersed, with capillary dissected leaves bearing little bladders, which float the plant at the time of flowering; or rooting in the mud, and sometimes with few or no leaves or bladders. Scapes 1 – few-flowered; usually flowering all summer. Bladders furnished with a valvular lid and usually with a few bristles at the orifice. (Name from *utriculus*, a little bladder.)

* *Upper leaves in a whorl on the otherwise naked scape, floating by means of large bladders formed of the inflated petioles; the lower leaves dissected and capillary, bearing small bladders; rootlets few or none.*

1. **U. inflàta,** Walt. Swimming free; bladder-like petioles oblong, pointed at the ends and branched near the apex, bearing fine thread-like divisions; flowers 3 – 10 (large, yellow); the appressed spur half the length of the corolla; style distinct. — In still water, Maine to Tex., near the coast.

* * *Scapes naked (except some small scaly bracts), from immersed branching stems, which commonly swim free, bearing capillary dissected leaves with small bladders on their lobes; roots few and not affixed, or none. (Mostly perennial, propagated from year to year by tuber-like buds.)*

+ *Cleistogamous flowers along the submersed copiously bladder-bearing stems.*

2. **U. clandestìna,** Nutt. Leaves numerous on the slender immersed stems, several times forked, capillary; scapes slender (3 – 5′ high); lips of the yellow corolla nearly equal in length, the lower broader and 3-lobed, somewhat longer than the approximate thick and blunt spur. — Ponds, from N. Brunswick and N. Eng. to N. J., near the coast.

+ + *No cleistogamous flowers.*

++ *Pedicels recurved in fruit; corolla yellow.*

3. **U. vulgàris,** L. (GREATER BLADDERWORT.) Immersed stems (1 – 3° long) *crowded with 2 – 3-pinnately many-parted capillary leaves, bearing many bladders;* scapes 5 – 12-flowered (6 – 12′ long); *corolla closed* (6 – 9″ broad), the sides reflexed; spur conical, rather shorter than the lower lip, thick and blunt in the European and the high northern plant; in the common American plant less thick and rather acute. — Common in ponds and slow streams, Newf. to Minn., south to Va. and Tex., and westward. (Eu., Asia.)

4. **U. mìnor,** L. (SMALLER B.) *Leaves scattered* on the thread-like immersed stems, 2 – 4 times *forked,* short; scapes weak, 2 – 8-flowered (3 – 7′ high); *upper lip of the gaping corolla not longer than the depressed palate; spur very short and blunt, or almost none.* — Shallow water, E. Mass. to Minn., south to N. J. and Ark., and westward. (Eu.)

++ ++ *Pedicels erect in fruit, few and slender; corolla yellow.*

5. **U. gíbba,** L. *Scape* (1 – 3′ high) 1 – 2-*flowered,* at base furnished with very slender short branches, bearing sparingly dissected capillary root-like leaves and scattered bladders; corolla 3 – 4″ broad, the lips broad and rounded, nearly equal; the *lower* with the sides reflexed, *exceeding and approximate to the very thick and blunt conical gibbous spur.* — Shallow water. Mass. to Mich., south to Va. and Ill.; Mt. Desert (*F. M. Day*).

6. **U. biflòra,** Lam. *Scape* (2 – 5′ high) 1 – 3-*flowered,* at the base bearing somewhat elongated submersed branches with capillary root-like leaves and numerous bladders; *corolla* 4 – 6″ *broad, the spur oblong, equalling the lower lip;* seeds scale-shaped. — Ponds and shallow waters, S. Ill. and Iowa to Tex.; also S. Va. (?), and Barnstable, Mass. (*W. Deane*).

7. **U. fibròsa,** Walt. *Leaves* crowded or whorled on the small immersed stems, several times forked, *capillary;* the bladders borne mainly along the stems; flowers 2 – 6 (6″ broad); lips nearly equal, broad and expanded, the

upper undulate, concave, plaited-striate in the middle; *spur nearly linear, obtuse,* approaching and almost equalling the lower lip. (U. striata, *Le Conte.*) — Shallow pools in pine barrens, L. Island and N. J. to Fla. and Ala.

8. **U. intermèdia,** Hayne. *Leaves* crowded on the immersed stems, 2-*ranked,* 4 – 5 times forked, *rigid,* the divisions linear-awl-shaped, minutely bristle-toothed along the margins; *the bladders borne on separate leafless branches;* upper lip of corolla much longer than the palate; *spur conical-subulate, acute, appressed to the very broad* (6 – 8″) *lower lip and nearly as long as it.* — Shallow pools, Newf. to N. J., west to Iowa, Minn., and northward. (Eu., Asia.)

++ ++ ++ *Pedicels erect in fruit, rather long: corolla violet-purple.*

9. **U. purpùrea,** Walt. Leaves whorled along the long immersed free floating stems, petioled, decompound, capillary, bearing many bladders; flowers 2 – 4 (6″ wide); spur appressed to the 3-lobed 2-saccate lower lip of the corolla and about half its length. — Ponds, Maine and N. Penn. to Fla., mainly near the coast; also Lake Co., Ind.

* * * *Scape solitary, slender and naked, or with a few small scales, the base rooting in the mud or soil; leaves small, awl-shaped or grass-like, often raised out of the water, commonly few or fugacious; air-bladders few on the leaves or rootlets, or commonly none.*

+ *Flower purple, solitary; leaves bearing a few delicate lobes.*

10. **U. resupinàta,** B. D. Greene. Scape (2 – 8′ high) 2-bracted above; leaves thread-like, on delicate creeping branches; corolla (4 – 5″ long) deeply 2-parted; spur oblong-conical, very obtuse, shorter than the dilated lower lip and remote from it, *both ascending,* the flower resting transversely on the summit of the scape. — Sandy margins of ponds, E. Maine to R. I., near the coast; also N. New York and Presque Isle, L. Erie.

+ + *Flowers* 2 – 10, (*chiefly*) *yellow: leaves entire, rarely seen.*

11. **U. subulàta,** L. Stem capillary (3 – 5′ high); *pedicels capillary: lower lip of the corolla flat* or with its margins recurved, *equally* 3-*lobed,* much larger than the ovate upper one; *spur oblong,* acute, straight, *appressed* to the lower lip, which it nearly equals in length. — Sandy swamps, and pine-barrens, Nantucket, Mass., to N. J., Fla., and Tex., near the coast.

Var. **cleistógama,** Gray. Only 1 – 2′ high, bearing 1 or 2 evidently cleistogamous purplish flowers, not larger than a pin's head; capsule becoming 1″ long. (The unnamed Utricularia in the Man., p. 320). — With the ordinary form; Barnstable and Nantucket, Mass., pine-barrens of N. J., and southward.

12. **U. cornùta,** Michx. Stem strict (3′ – 1° high), 1 – 5-flowered; *pedicels not longer than the calyx;* corolla 1′ long, the *lower lip large and helmet-shaped,* its centre very convex and projecting, while the sides are strongly reflexed; upper lip obovate and much smaller; *spur awl-shaped, turned downward* and outward, about as long as the lower lip. — Peat-bogs, or sandy swamps, Newf. to Minn., south to Fla. and Tex.; common.

## 2. PINGUÍCULA, Tourn. BUTTERWORT.

Upper lip of the calyx 3-cleft, the lower 2-cleft. Corolla with an open hairy or spotted palate, the lobes spreading. — Small and stemless perennials, growing on damp rocks, with 1-flowered scapes, and broad and entire leaves, all clustered at the root, soft-fleshy, mostly greasy to the touch (whence the name, from *pinguis*, fat).

1. **P. vulgàris,** L. Leaves ovate or elliptical; scape and calyx a little pubescent; lips of the violet corolla very unequal, the tube funnel-form; spur straightish. — Wet rocks, northern N. Eng. and N. Y. to Minn., and far northward. (Eu., Asia.)

## ORDER 78. BIGNONIÀCEÆ. (BIGNONIA FAMILY.)

*Woody plants, monopetalous, didynamous or diandrous, with the ovary commonly 2-celled by the meeting of the two parietal placentæ or of a projection from them, many-ovuled; fruit a dry capsule, the large flat winged seeds with a flat embryo and no albumen, the broad and leaf-like cotyledons notched at both ends.* — Calyx 2-lipped, 5-cleft, or entire. Corolla tubular or bell-shaped, 5-lobed, somewhat irregular or 2-lipped, deciduous; the lower lobe largest. Stamens inserted on the corolla; the fifth or posterior one, and sometimes the shorter pair also, sterile or rudimentary; anthers of 2 diverging cells. Ovary free, bearing a long style, with a 2-lipped stigma. — Leaves compound or simple, opposite, rarely alternate. Flowers large and showy. — Chiefly a tropical family.

| | | |
|---|---|---|
| 1. **Bignonia.** | Pod flattened parallel with the partition. | Leaves compound, tendril-bearing. |
| 2. **Tecoma.** | Pod flattish contrary to the partition. | Leaves compound, without tendrils. |
| 3. **Catalpa.** | Pod terete. Fertile stamens only 2. | Trees; leaves simple. |

### 1. BIGNÒNIA, Tourn.

Calyx truncate, or slightly 5-toothed. Corolla somewhat bell-shaped, 5-lobed and rather 2-lipped. Stamens 4, often showing a rudiment of the fifth. Capsule linear, 2-celled, flattened parallel with the valves and partition. Seeds transversely winged. — Woody climbers, with chiefly compound leaves, terminating in a tendril. (Named for the *Abbé Bignon.*)

1. **B. capreolàta,** L. (CROSS-VINE.) Smooth; leaves of 2 ovate or oblong leaflets and a branched tendril, often with a pair of accessory leaves in the axil resembling stipules; peduncles few and clustered, 1-flowered; corolla orange, 2′ long; pod 6′ long; seeds with the wing 1½′ long. — Rich soil, Va. to S. Ill. and south to Fla. and La. April. Climbing tall trees; a transverse section of the wood showing a cross.

### 2. TÉCOMA, Juss. TRUMPET-FLOWER.

Calyx bell-shaped, 5-toothed. Corolla funnel-form, 5-lobed, a little irregular. Stamens 4. Capsule 2-celled, with the partition at right angles to the convex valves. Seeds transversely winged. — Woody, with compound leaves, climbing by aerial rootlets. (Abridged from the Mexican name.)

1. **T. radìcans,** Juss. (TRUMPET CREEPER.) Leaves pinnate; leaflets 9 – 11, ovate, pointed, toothed; flowers corymbed; stamens not protruded beyond the tubular-funnel-form orange and scarlet corolla (2½ – 3′ long); pod oblanceolate, 4 – 5′ long. — Moist soil, Penn. to Ill., south to Fla. and Tex. Common in cultivation farther north.

### 3. CATÁLPA, Scop., Walt. CATALPA. INDIAN BEAN.

Calyx deeply 2-lipped. Corolla bell-shaped, swelling; the undulate 5-lobed spreading border irregular and 2-lipped. Fertile stamens 2, or sometimes 4; the 1 or 3 others sterile and rudimentary. Capsule very long and slender, nearly cylindrical, 2-celled, the partition at right angles to the valves. Seeds winged on each side, the wings cut into a fringe. — Trees, with ovate or cordate and mainly opposite leaves. (The aboriginal name.)

1. **C. speciòsa,** Warder. A large and tall tree, with thick bark; leaves ample, heart-shaped, long-acuminate; corolla 2′ long, nearly white, inconspicuously spotted, with obconical tube and slightly oblique limb, the lower lobe emarginate; capsule thick. — Low rich woodlands, S. Ind. to Tenn., Mo., and Ark. May.

**C.** BIGNONIOÌDES, Walt., of Ga., Ala. and Miss., very widely cultivated, and formerly including the above species, is a low much branched tree, with thin bark, smaller (1½′ long) thickly spotted corolla (with oblique limb and lower lobe entire), and a much thinner capsule.

## ORDER 79. PEDALIÀCEÆ.

*Herbs, with chiefly opposite simple leaves, and flowers as of the preceding Order, except in structure of ovary and fruit, the former being* 1*-celled, the latter fleshy-drupaceous, with wingless seeds and thick entire cotyledons.* — Ovary (in ours) 1-celled, with 2 parietal intruded placentæ expanded into 2 broad lamellæ or united into a central columella.

### 1. MARTÝNIA, L. UNICORN-PLANT.

Calyx 5-cleft, mostly unequal. Corolla gibbous, bell-shaped, 5-lobed and somewhat 2-lipped. Fertile stamens 4, or only 2. Fruit fleshy, the flesh at length falling away in 2 valves; the inner part woody, terminated by a beak, which at length splits into 2 hooked horns, and opens at the apex between the horns, imperfectly 5-celled, owing to the divergence of the two plates of each placenta, leaving a space in the centre, while by reaching and cohering with the walls of the fruit they form 4 other cells. Seeds several, wingless, with a thick roughened coat. — Low branching annuals, clammy-pubescent, exhaling a heavy odor, stems thickish; leaves simple, rounded; flowers racemed, large. (Dedicated to *Prof. John Martyn*, of Cambridge, England.)

1. **M. proboscídea,** Glox. Leaves heart-shaped, oblique, entire or undulate, the upper alternate; corolla dull white or purplish, or spotted with yellow and purple; endocarp of the fruit crested on one side, long-beaked. — Banks of the Mississippi and its lower tributaries, from S. Ind., Ill., and Iowa, to northern Mexico. Also cultivated and naturalized farther north.

## ORDER 80. ACANTHÀCEÆ. (ACANTHUS FAMILY.)

*Chiefly herbs, with opposite simple leaves, didynamous or diandrous stamens, inserted on the tube of the more or less 2-lipped corolla, the lobes of which are convolute or imbricated in the bud; fruit a 2-celled and few-* (4–12-) *seeded capsule: seeds anatropous, without albumen, usually flat and* *supported by hooked projections of the placentæ* (*retinacula*). — Flowers commonly much bracted. Calyx 5-cleft. Style thread-form; stigma simple or 2-cleft. Pod loculicidal, usually flattened contrary to the valves and partition. Cotyledons broad and flat. — Mucilaginous and slightly bitter, not noxious. A large family in the warmer parts of the world; represented in gardens by THUNBERGIA, which differs from the rest by the globular pod and seeds, the latter not on hooks.

* Corolla not obviously bilabiate, the 5 lobes broad and roundish, spreading; stamens 4.

1. **Calophanes.** Calyx-lobes long-filiform. Capsule 2 - 4-seeded.
2. **Ruellia.** Calyx-lobes mostly linear or lanceolate. Capsule 6 - 20-seeded.

* * Corolla bilabiate, upper lip erect and concave, lower spreading; stamens 2.

3. **Dianthera.** Capsule obovate, flattened, 4-seeded.

## 1. CALÓPHANES, Don.

Calyx deeply 5-cleft or parted; its lobes elongated setaceous-acuminate or aristiform. Corolla funnel-form, with ample limb, convolute in the bud. Stamens 4, the anthers mucronate or sometimes aristate at base. Ovules a single pair in each cell. Capsule oblong-linear, 2 - 4-seeded. — Low branching perennials, pubescent or hirsute, with proportionally large axillary nearly sessile flowers (solitary or few), and blue corolla. (Name from καλός, *beautiful*, and φαίνω, *to appear*.)

1. **C. oblongifòlia,** Don. Stems usually erect and simple, ½ - 1° high; leaves from narrowly oblong to oval, very obtuse, sessile (1′ long or less); corolla blue, sometimes purple-dotted or mottled, seldom 1′ long; calyx-lobes nearly distinct, filiform-setaceous, hirsute. — Pine-barrens, S. Va. to Fla.

## 2. RUÉLLIA, Plumier.

Calyx 5-parted. Corolla funnel-form, with spreading ample border, convolute in the bud. Stamens 4, the cells of the somewhat arrow-shaped anthers parallel and nearly equal. Capsule narrow, in our species somewhat flattened, contracted and seedless at the base, above 8 - 12-seeded. Seeds with a mucilaginous coat, when wet exhibiting under the microscope innumerable tapering short bristles, their walls marked with rings or spirals. — Perennials, with rather large and showy blue or purple flowers, mostly in axillary clusters, sometimes also with small flowers precociously close-fertilized in the bud. Calyx often 2-bracteolate. (Named for the early herbalist, *John Ruelle*.)

1. **R. ciliòsa,** Pursh. *Hirsute* with soft whitish hairs (1 - 3° high); *leaves nearly sessile, oval* or ovate-oblong (1 - 2′ long); flowers 1 - 3 and almost sessile in the axils; *tube of the corolla* (1 - 1½′ long) fully *twice the length of the setaceous calyx-lobes;* the throat short. — Dry ground, Mich. to Minn., south to Fla. and La. June - Sept. — Var. AMBÍGUA, Gray. Sparingly hirsute-pubescent or glabrate; leaves ovate-oblong, usually short-petioled, larger; tube of corolla little exceeding the hardly hirsute calyx. — Va. and Ky. to Ala. Appearing like a hybrid with the next.

2. **R. strèpens,** L. *Glabrous or sparingly pubescent* (1 - 4° high); *leaves narrowed at base into a petiole,* ovate, obovate, or mostly oblong (2½ - 5′ long); *tube of the corolla* (about 1′ long) little longer than the dilated portion, *slightly*

*exceeding the lanceolate or linear calyx-lobes.* — Rich soil, Penn. to Wisc., south to Fla. and Tex. July – Sept. — Var. CLEISTÁNTHA, Gray. Leaves commonly narrower and oblong; flowers for most of the season cleistogamous. — Common with the ordinary form.

### 3. DIANTHÈRA, Gronov. WATER-WILLOW.

Calyx 5-parted. Corolla deeply 2-lipped; the upper lip erect, notched; the lower spreading, 3-parted, external in the bud. Stamens 2; anthers 2-celled, the cells separated and somewhat unequal. Capsule obovate, flattened, contracted at base into a short stalk, 4-seeded. — Perennial herbs, growing in water or wet places, with entire leaves, and purplish flowers in axillary peduncled spikes or heads. (Name formed of *δίs, double*, and *ἀνθηρά, anther*, the separated cells giving the appearance of two anthers on each filament.)

1. **D. Americàna,** L. Stem 1 – 3° high; leaves linear-lanceolate, elongated; spikes oblong, dense, long-peduncled; corolla 4 – 5″ long. — In water, N. W. Vt. to Wisc., south to S. C. and Tex. July – Sept.

## ORDER 81. VERBENÀCEÆ. (VERVAIN FAMILY.)

*Herbs or shrubs, with opposite leaves, more or less 2-lipped or irregular corolla, and didynamous stamens, the* 2 – 4-*celled* (in Phryma 1-celled) *fruit dry or drupaceous, usually splitting when ripe into as many* 1-*seeded indehiscent nutlets;* differing from the following order in the ovary not being 4-lobed, the style therefore terminal, and the plants seldom aromatic or furnishing a volatile oil. — Seeds with a straight embryo and little or no albumen. — A large order in the warmer parts of the world, sparingly represented in cool regions.

**Tribe I. VERBENEÆ.** Ovary 2 – 4-celled, with an erect anatropous ovule in each cell.

1. **Verbena.** Flowers in spikes or heads. Calyx tubular. Fruit splitting into 4 nutlets.
2. **Lippia.** Flowers in spikes or heads. Calyx short, 2-cleft. Fruit splitting into 2 nutlets.
3. **Callicarpa.** Flowers in axillary cymes. Calyx short. Fruit berry-like, with 4 nutlets.

**Tribe II. PHRYMEÆ.** Ovary 1-celled; ovule erect, orthotropous.

4. **Phryma.** Flowers in slender spikes. Calyx cylindrical, 2-lipped. Fruit an achene.

### 1. VERBÈNA, Tourn. VERVAIN.

Calyx tubular, 5-toothed, one of the teeth often shorter than the others. Corolla tubular, often curved, salver-form; the border somewhat unequally 5-cleft. Stamens included; the upper pair occasionally without anthers. Style slender; stigma mostly 2-lobed. Fruit splitting into 4 seed-like nutlets. — Flowers sessile, in single or often panicled spikes, bracted; produced all summer. (The Latin name for any sacred herb; derivation obscure.) — The species present numerous spontaneous hybrids.

§ 1. *Anthers not appendaged; flowers small, in narrow spikes.*

* *Spikes filiform, with flowers or at least fruits scattered, naked, the inconspicuous bracts shorter than the calyx.*

**V.** OFFICINÀLIS, L. (EUROPEAN V.) Annual, glabrous or nearly so, loosely branched (1 – 3° high); *leaves pinnatifid or 3-cleft, oblong-lanceolate,* sessile, smooth above, the lobes cut and toothed; spikes panicled; *flowers purplish*, very small. — Roadsides and old fields, N. J. to Minn., south to Tex., and westward. (Nat. from Eu.)

1. **V. urticæfòlia,** L. (WHITE V.) Perennial, from minutely pubescent to almost glabrous, rather tall (3 – 5° high); *leaves oval or oblong-ovate, acute, coarsely serrate, petioled;* spikes at length much elongated, loosely panicled; flowers very small, *white.* — Waste or open grounds. (Trop. Am.)

* * *Spikes thicker or densely flowered; the fruits crowded, mostly overlapping each other; bracts inconspicuous, not exceeding the flowers; perennial.*

2. **V. angustifòlia,** Michx. Low (6 – 18′ high), often simple; *leaves narrowly lanceolate, tapering to the base, sessile, roughish,* slightly toothed; spikes few or single; the purple flowers crowded, larger than in the next. — Dry or sandy ground, Mass. to Minn., south to Fla. and Ark.

3. **V. hastàta,** L. (BLUE VERVAIN.) Tall (4 – 6° high); *leaves lanceolate or oblong-lanceolate,* taper-pointed, cut-serrate, *petioled, the lower often lobed and sometimes halberd-shaped* at base; *spikes linear, erect,* corymbed or panicled; flowers blue. — Waste grounds and roadsides; common.

4. **V. strícta,** Vent. (HOARY V.) *Downy with soft whitish hairs,* erect, simple or branched (1 – 2° high); *leaves sessile, obovate or oblong, serrate; spikes thick,* somewhat clustered, hairy; flowers rather large, purple. — Barrens and prairies, Ohio to Dak., south to Tex. and N. Mex.

* * * *Spikes thick, sessile and leafy-bracted; annual.*

5. **V. bracteòsa,** Michx. Widely spreading or procumbent, hairy; leaves wedge-lanceolate, cut-pinnatifid or 3-cleft, short-petioled; spikes single, remotely flowered; bracts large, the lower pinnatifid, longer than the small purple flowers. — Prairies and waste grounds, Ohio to Minn., south and westward.

§ 2. *Anthers of the longer stamens glandular-tipped; flowers showy, from depressed-capitate becoming spicate.*

6. **V. bipinnatífida,** Nutt. *Hispid-hirsute,* ½ – 1° high; *leaves* (1½ – 4′ long) *bipinnately parted,* or 3-parted into more or less bipinnatifid divisions, the lobes commonly linear or broader; *bracts mostly surpassing the calyx;* limb of bluish-purple or lilac corolla 4 – 5″ *broad.* — Plains and prairies, Kan. to Ark. and Tex., and westward.

7. **V. Aublètia,** L. Slender, 1° high or less, *soft-pubescent or glabrate; leaves* (1 – 2′ long) *ovate or ovate-oblong in outline, with a wedge-shaped base, incisely lobed and toothed,* often more deeply 3-cleft; *bracts shorter than or equalling the calyx;* limb of reddish-purple or lilac (rarely white) corolla 6 – 8″ *broad.* — Open woods and prairies, Ind. and Ill. to Fla., Ark., and N. Mex.

## 2. LÍPPIA, Houst.

Calyx short, often flattened, 2 – 4-toothed, or 2-lipped. Corolla 2-lipped; upper lip notched, the lower much larger, 3-lobed. Stamens included. Style slender; stigma obliquely capitate. Fruit 2-celled, 2-seeded. (Dedicated to *Augustus Lippi,* an Italian naturalist and traveller.)

1. **L. lanceolàta,** Michx. (FOG-FRUIT.) *Creeping extensively, roughish, green; leaves oblanceolate or wedge-spatulate,* serrate above; *peduncles axillary, slender, exceeding the leaves,* bearing solitary closely bracted heads of bluish-

white flowers; *bracts mucronate or pointless.* — River-banks, E. Penn. to Minn., south to Fla. and Tex. July – Sept.

2. **L. cuneifòlia,** Steud. Diffusely branched from a woody base, procumbent (*not creeping*), *minutely canescent throughout; leaves rigid, cuneate-linear,* incisely 2 – 6-toothed above the middle; peduncles axillary, *mostly shorter than the leaves;* bracts rigid, broadly cuneate, *abruptly acuminate;* corolla white (*!*). — Plains, W. Neb. to central Kan. and Arizona.

### 3. CALLICÁRPA, L.

Calyx 4 – 5-toothed, short. Corolla tubular-bell-shaped, 4 – 5-lobed, nearly regular. Stamens 4, nearly equal, exserted; anthers opening at the apex. Style slender, thickened upward. Fruit a small berry-like drupe, with 4 nutlets. — Shrubs, with scurfy pubescence, and small flowers in axillary cymes. (Name formed of κάλλος, *beauty,* and καρπος, *fruit.*)

1. **C. Americàna,** L. (French Mulberry.) Leaves ovate-oblong with a tapering base, acuminate, toothed, whitish beneath; cymes many-flowered; calyx obscurely 4-toothed; corolla bluish; fruit violet-color. — Rich soil, Va. to Tex., thence north to Mo. May – July.

### 4. PHRỲMA, L. Lopseed.

Calyx cylindrical, 2-lipped; the upper lip of 3 bristle-awl-shaped teeth; the lower shorter, 2-toothed. Corolla 2-lipped; upper lip notched; the lower much larger, 3-lobed. Stamens included. Style slender; stigma 2-lobed. Fruit dry, in the bottom of the calyx, oblong, 1-celled and 1-seeded. Seed orthotropous. Cotyledons convolute round their axis. — A perennial herb, with slender branching stems, and coarsely toothed ovate leaves, the lower long-petioled; the small opposite flowers in elongated and slender terminal spikes, strictly reflexed in fruit. Corolla purplish or rose-color. (Derivation of the name unknown.)

1. **P. Leptostàchya,** L. Plant 2 – 3° high; leaves 3 – 5′ long, thin; calyx strongly ribbed and closed in fruit, the long slender teeth hooked at the tip. — Moist and open woods, common. (E. Asia.)

## Order 82. LABIÀTÆ. (Mint Family.)

*Chiefly herbs, with square stems, opposite aromatic leaves, more or less 2-lipped corolla, didynamous or diandrous stamens, and a deeply 4-lobed ovary, which forms in fruit 4 little seed-like nutlets or achenes, surrounding the base of the single style in the bottom of the persistent calyx, each filled with a single erect seed.* — Nutlets smooth or barely roughish and fixed by their base, except in the first tribe. Albumen mostly none. Embryo straight (except in Scutellaria); radicle at the base of the fruit. Upper lip of the corolla 2-lobed or sometimes entire; the lower 3-lobed. Stamens inserted on the tube of the corolla. Style 2-lobed at the apex. Flowers axillary, chiefly in cymose clusters, these often aggregated in terminal spikes or racemes. Foliage mostly dotted with small glands containing a volatile oil, upon which depends the warmth and aroma of the plants of this large and well-known family.

## I. Nutlets rugose-reticulated, attached obliquely or ventrally; ovary merely 4-lobed.

**Tribe I. AJUGOIDEÆ.** Stamens 4, ascending and parallel, mostly exserted from the upper side of the corolla. Calyx 5-10-nerved.

* Limb of corolla merely oblique, of 5 nearly equal and similar lobes.

1. **Trichostema.** Corolla-lobes all declined. Calyx oblique. Stamens exserted.
2. **Isanthus.** Calyx bell-shaped. Corolla small, the lobes spreading. Stamens included.

* * Limb of corolla irregular, seemingly unilabiate, the upper lip being either split down or very short; stamens exserted from the cleft.

3. **Teucrium.** Corolla deeply cleft between the 2 small lobes of the upper lip.
4. **Ajuga.** Corolla with a very short and as if truncate upper lip.

## II. Nutlets smooth or granulate; scar basal, small; ovary deeply 4-parted.

**Tribe II. SATUREINEÆ.** Upper pair of stamens shorter or wanting; anthers 2-celled. Upper lip of corolla not galeate or concave.

* Flowers in loose terminal panicled racemes; calyx 2-lipped, enlarged and declined in fruit.

5. **Collinsonia.** Lower lobe of corolla fimbriate, much the largest. Stamens 2.
6. **Perilla.** Corolla short, the lower lobe little larger. Stamens 4, included.

* * Flowers in more or less crowded clusters or whorls, axillary or spicate.

+ Corolla not evidently 2-lipped, but almost equally 4-lobed, small. Stamens erect, distant.

7. **Mentha.** Fertile stamens 4, nearly equal.
8. **Lycopus.** Fertile stamens 2, and often 2 sterile filaments without anthers.

+ + Corolla more or less 2-lipped.

++ Stamens distant and straight, often divergent, never convergent nor curved.

= Stamens 2, with or without rudiments of the upper pair.

9. **Cunila.** Calyx very hairy in the throat, equally 5-toothed. Corolla small.

= = Stamens 4; calyx 10-13-nerved, and hairy in the throat (except n. 10).

10. **Hyssopus.** Calyx tubular, 15-nerved, equally 5-toothed. Stamens exserted.
11. **Pycnanthemum.** Calyx ovate or short-tubular, equally 5-toothed or somewhat 2-lipped. Flowers in dense heads or clusters.
12. **Origanum.** Calyx ovate-bell-shaped, 5-toothed. Spikes with large colored bracts.
13. **Thymus.** Calyx ovate, nodding in fruit, 2-lipped. Bracts minute; leaves very small.

++ ++ Stamens (often 2 only in n. 16) ascending or arcuate, often more or less converging (or ascending parallel under the erect upper lip in n. 14 and 15).

14. **Satureia.** Calyx bell-shaped, 10-nerved, naked in the throat, equally 5-toothed.
15. **Calamintha.** Calyx tubular, often hairy in the throat, 13-nerved, 2-lipped. Tube of corolla straight.
16. **Melissa.** Calyx tubular-bell-shaped, flattish on the upper side. Corolla curved upward.
17. **Hedeoma.** Calyx gibbous on the lower side, hairy in the throat. Flowers loose.

**Tribe III. MONARDEÆ.** Stamens 2, ascending and parallel; anthers apparently or really 1-celled. Corolla strongly 2-lipped.

18. **Salvia.** Calyx 2-lipped. Anthers with a long connective astride the filament, bearing a linear cell at the upper end, and none or an imperfect cell on the lower.
19. **Monarda.** Calyx tubular and elongated, equally 5-toothed. Anthers of 2 cells confluent into one, the connective inconspicuous.
20. **Blephilia.** Calyx ovate-tubular, 2-lipped. Anthers as in the last.

**Tribe IV. NEPETEÆ.** Stamens 4, the upper (inner) pair longer than the lower, ascending or diverging. Corolla 2-lipped; the upper lip concave or arched, the lower spreading. Calyx mostly 15-nerved.

* Anthers not approximate in pairs; their cells parallel or nearly so.

21. **Lophanthus.** Stamens divergent, exserted; upper pair declined, lower ascending.
22. **Cedronella.** Stamens all ascending, not exceeding the lip of the corolla.

* * Anthers more or less approximate in pairs; their cells divaricate or divergent; filaments ascending, not exserted.

23. **Nepeta.** Calyx more or less curved, equally 5-toothed.
24. **Dracocephalum.** Calyx straight, the upper tooth much the larger.

**Tribe V. SCUTELLARINEÆ.** Stamens 4, ascending and parallel. Calyx bilabiate, closed in fruit; the rounded lips entire. Corolla bilabiate, the upper lip arched.

25. **Scutellaria.** Calyx with a helmet-like projection on the upper side.

**Tribe VI. STACHYDEÆ.** Stamens 4, parallel and ascending under the galeate or concave upper lip, the lower (outer) pair longer (except in n. 31, 32). Calyx 5-10-nerved, not 2-lipped (except in n. 26).

* Calyx reticulate-veiny, deeply bilabiate, closed in fruit.

26. **Brunella.** Calyx nerved and veiny; upper lip flat, 3-toothed, the lower 2-cleft.

* * Calyx thin, inflated in fruit, obscurely nerved, 3-5-lobed, open.

27. **Physostegia.** Calyx 5-toothed or 5-lobed. Anther-cells parallel.
28. **Synandra.** Calyx almost equally 4-lobed! Anther-cells widely divergent.

* * * Calyx of firmer texture, distinctly 5-10-nerved or striate, 5-10-toothed.

+- Stamens included in the short corolla-tube, its upper lip merely concave.

29. **Marrubium.** Calyx tubular, 5-10-nerved, and with 5 or 10 awl-shaped teeth.

+- +- Stamens ascending under the galeate upper lip of the corolla.

++ Stamens not deflexed after anthesis; naturalized from the Old World.

30. **Ballota.** Calyx somewhat funnel-form, expanding above into a spreading 5-toothed border. Nutlets roundish at top. Upper lip of the corolla erect.
31. **Phlomis.** Calyx tubular, the 5 teeth abruptly awned. Upper lip of the corolla arched.
32. **Leonurus.** Calyx top-shaped, the rigid spiny-pointed teeth soon spreading. Nutlets truncate and acutely 3-angled at top. Leaves cleft or incised.
33. **Lamium.** Calyx-teeth not spiny-pointed. Nutlets sharply 3-angled, truncate.
34. **Galeopsis.** Calyx tubular-bell-shaped; the 5 teeth spiny-pointed. Anthers transversely 2-valved, the smaller valve ciliate.

++ ++ Stamens often deflexed or contorted after anthesis.

35. **Stachys.** Calyx tubular-bell-shaped, equally 5-toothed or the 2 upper teeth united into one. Nutlets rounded at top.

## 1. TRICHOSTÈMA, L. Blue Curls.

Calyx bell-shaped, oblique, deeply 5-cleft; the 3 upper teeth elongated and partly united, the 2 lower very short. Corolla 5-lobed; the lobes narrowly oblong, declined, nearly equal in length; the 3 lower more or less united. Stamens 4, with very long capillary filaments, exserted much beyond the corolla, curved; anther-cells divergent and at length confluent. — Low annuals, somewhat clammy-glandular and balsamic, branched, with entire leaves, and mostly solitary 1-flowered pedicels terminating the branches, becoming lateral by the production of axillary branchlets, and the flower appearing to be reversed, namely, the short teeth of the calyx upward, etc. Corolla blue, varying to pink, rarely white, small; in summer and autumn. (Name composed of θρίξ, *hair*, and στῆμα, *stamen*, from the capillary filaments.)

1. **T. dichótomum,** L. (Bastard Pennyroyal.) Viscid with rather minute pubescence; *leaves lance-oblong or rhombic-lanceolate*, rarely lance-linear, short-petioled. — Sandy fields, E. Mass. to Ky., south to Fla. and Tex.

2. **T. lineàre,** Nutt. Puberulent, more slender and less forked; *leaves linear*, nearly smooth.—Conn. to La., near the coast; in sandy ground.

## 2. ISÁNTHUS, Michx. FALSE PENNYROYAL.

Calyx bell-shaped, 5-lobed, equal, enlarged in fruit. Corolla little longer than the calyx; the border bell-shaped, with 5 nearly equal and obovate spreading lobes. Stamens 4, slightly didynamous, incurved-ascending, scarcely exceeding the corolla. — A low, much branched annual, clammy-pubescent, with nearly entire lance-oblong 3-nerved leaves, and small pale blue flowers on axillary 1–3-flowered peduncles. (Name from ἴσος, *equal*, and ἄνθος, *flower*, referring to the almost regular corolla.)

1. **I. cærùleus,** Michx. Corolla 2–3′′ long, little exceeding the calyx. — Dry or sterile ground, Maine to Ill., Minn., and southward. July, August.

## 3. TEÙCRIUM, Tourn. GERMANDER.

Calyx 5-toothed. Corolla with the 4 upper lobes nearly equal, oblong, turned forward, so that there seems to be no upper lip; the lower lobe much larger. Stamens 4, exserted from the deep cleft between the 2 upper lobes of the corolla; anther-cells confluent. (Named for *Teucer*, king of Troy.)

1. **T. Canadénse,** L. (AMERICAN GERMANDER. WOOD SAGE.) Perennial, *downy*, erect (1–3° high); leaves ovate-lanceolate, serrate, rounded at base, short-petioled, hoary underneath, the floral scarcely longer than the oblique unequally-toothed calyx; whorls about 6-flowered, crowded in a long and simple wand-like spike; *calyx canescent, the* 3 *upper lobes very obtuse* or the middle one acutish; corolla purple, rose, or sometimes cream-color (6′′ long). — Low grounds; not rare. July–Sept.

2. **T. occidentàle,** Gray. *Loosely pubescent; calyx villous with viscid hairs, the upper lobes acute or middle one acuminate;* corolla 4–5′′ long; otherwise like the last. — A western form, from Neb. southwestward, and extending eastward (Ont., and near Philadelphia).

## 4. ÁJUGA, L.

Calyx 5-toothed. Corolla with very short and as if truncate upper lip; the large and spreading lower lip with the middle lobe emarginate or 2-cleft. Stamens as in Teucrium, but anther-cells less confluent. (From α- privative, and ζυγόν (Latin *jugum*), *yoke*, from the seeming absence of a yoke-fellow to the lower lip of the corolla.)

**A.** RÉPTANS, L. Perennial, about 1° high, with copious creeping stolons; leaves obovate or spatulate, sometimes sinuate, the cauline sessile, the floral approximate, subtending several sessile blue flowers. — Naturalized near Saco, Maine, Montreal, etc. (Eu., N. Asia.)

## 5. COLLINSÒNIA, L. HORSE-BALM.

Calyx ovate, enlarged and declined in fruit, 2-lipped; upper lip truncate and flattened, 3-toothed, the lower 2-cleft. Corolla elongated, expanded at the throat, somewhat 2-lipped, the tube with a bearded ring within; the 4 upper lobes nearly equal, but the lower much larger and longer, pendent, toothed or lacerate-fringed. Stamens 2 (sometimes 4, the upper pair shorter), much exserted, diverging; anther-cells divergent. — Strong-scented perennials, with large ovate leaves, and yellowish flowers on slender pedicels, in loose and panicled terminal racemes. (Named in honor of *Peter Collinson*, a well-known patron of science and correspondent of Linnæus, who introduced it into England.)

**1. C. Canadénsis,** L. (Rich-weed. Stone-root.) Nearly smooth (1–3° high); leaves serrate, pointed, petioled (3–6′ long); panicle loose; corolla 8–9″ long, lemon-scented; stamens 2. — Rich moist woods, N. Brunswick to Wisc., south to Fla. and Mo. July–Sept.

### 6. PERÍLLA, L.

Calyx as in Collinsonia. Corolla-tube included, the limb 5-cleft; lower lobe a little larger. Stamens 4, included, erect, distant. — Coarse aromatic annual, with small flowers in panicled and axillary racemes. (A Greek and Latin proper name.)

**P.** OCYMOÌDES, L. Erect, branching, 2–3° high; leaves ovate, coarsely toothed; flowers white. — About dwellings and roadsides, S. Ill. (*Schneck.*) (Adv. from E. Asia.)

### 7. MÉNTHA, Tourn. Mint.

Calyx bell-shaped or tubular, 5-toothed, equal or nearly so. Corolla with a short included tube; the bell-shaped border somewhat equally 4-cleft; the upper lobe broadest, entire or notched. Stamens 4, equal, erect, distant. — Odorous perennial herbs; the small flowers mostly in close clusters, forming axillary capitate whorls, sometimes approximated in interrupted spikes, produced in summer, of two sorts as to the fertility of the stamens in most species. Corolla pale purple or whitish. Species mostly adventive or naturalized from Europe, with many hybrids. (Μίνθη of Theophrastus, from a Nymph of that name, fabled to have been changed into Mint by Proserpine.)

* *Spikes narrow and leafless, densely crowded; leaves sessile or nearly so.*

**M.** SYLVÉSTRIS, L. (Horse Mint of Eu.) *Finely pubescent or canescent; leaves ovate-oblong to oblong-lanceolate,* acute, sharply serrate, often glabrous above; spikes rather slender, *canescently pubescent.* — Roadsides, etc., Penn. — Var. ALOPECUROÌDES, Baker. Leaves larger, more nearly sessile, broadly oval and obtuse, often subcordate, coarsely serrate, more veiny, but not rugose; approaching the next. — Penn. and N. J.

**M.** ROTUNDIFÒLIA, L. *Soft-hairy* or downy; *leaves* broadly elliptical to *round-ovate* and somewhat heart shaped, *rugose,* crenate-toothed; spikes slender, *not canescent.* — Atlantic States, at a few stations, Maine to Tex.

**M.** VÍRIDIS, L. (Spearmint.) *Nearly smooth; leaves oblong- or ovate-lanceolate,* unequally serrate; bracts linear-lanceolate and subulate, conspicuous. — Wet places; in all cultivated districts.

* * *Flowers pedicellate, less crowded, in interrupted leafless spikes, or some in the upper axils; leaves petioled.*

**M.** PIPERÌTA, L. (Peppermint.) *Glabrous* (somewhat hairy in var. SUBHIRSÙTA), very pungent-tasted; leaves ovate-oblong to oblong-lanceolate, acute, sharply serrate; *spikes narrow, loose.* — Along brooks, escaped everywhere.

**M.** AQUÁTICA, L. (Water Mint.) *Pubescent* or smoothish; leaves ovate or round-ovate; flowers in a terminal *globular or interrupted and oblong head,* often with one or more clusters in the axils of the upper leaves; calyx and usually the pedicels hairy. The common form has the stems *hairy downward.* — Wet places, N. Eng. to Del.; rare. — Var. CRÍSPA, Benth., is a glabrous or glabrate form, with lacerate-dentate and crisped leaves. — Ditches, N. J., etc.

* * * *Flowers in globular whorls or clusters, all in the axils of the leaves, the uppermost axils not flower-bearing; leaves more or less petioled, toothed.*

**M.** SATÌVA, L. (Whorled Mint.) *Stem hairy downward;* leaves ovate, sharply serrate; calyx oblong-cylindrical with *very slender teeth.* — Waste damp places, Mass. to Penn.; not common. Passes into the next.

**M. arvénsis**, L. (Corn Mint.) Lower and smaller-leaved than the last; leaves obtusely serrate; *calyx bell-shaped, the teeth short* and broader. — Moist fields, N. Eng., etc.; rare.

1. **M. Canadénsis**, L. (Wild Mint.) *Leaves* varying from ovate-oblong to lanceolate, *tapering to both ends;* calyx oblong-bell-shaped, the teeth rather short; hairs on the stem not conspicuously reflexed. The commoner form is more or less hairy, and has nearly the odor of Pennyroyal. — Wet places, through the northern U. States across the continent, and northward.

Var. **glabràta**, Benth. Leaves and stems almost glabrous, the former sometimes very short-petioled; scent sweeter, as of Monarda. — Similar range.

## 8. LÝCOPUS, Tourn. Water Horehound.

Calyx bell-shaped, 4–5-toothed, naked in the throat. Corolla bell-shaped, scarcely longer than the calyx, nearly equally 4-lobed. Stamens 2, distant; the upper pair either sterile rudiments or wanting. Nutlets with thickened margins. — Perennial low herbs, glabrous or puberulent, resembling Mints, with sharply toothed or pinnatifid leaves, the floral ones similar and much longer than the dense axillary whorls of small mostly white flowers; in summer. (Name compounded of *λύκος, a wolf,* and *πους, foot,* from some fancied likeness in the leaves.)

* *Stoloniferous, the long filiform runners often tuberiferous; leaves only serrate.*

+ *Calyx-teeth usually* 4, *barely acutish, shorter than the mature nutlets.*

1. **L. Virgínicus**, L. (Bugle-weed.) Stem obtusely 4-angled (6′–2° high); leaves oblong or ovate-lanceolate, toothed, entire toward the base, acuminate at both ends, short-petioled; calyx-teeth ovate. — Shady moist places, Lab. to Fla., Mo., and northwestward across the continent.

+ + *Calyx-teeth usually* 5, *very acute, longer than the nutlets.*

++ *Bracts minute; corolla twice as long as the calyx.*

2. **L. sessilifòlius**, Gray. Stem rather acutely 4-angled; *leaves closely sessile,* ovate or lanceolate-oblong (1–2′ long), sparsely sharply serrate; *calyx-teeth subulate, rigid.* (L. Europæus, var. sessilifolius, *Gray,* Man.) — Pine barrens of N. J. to Cape Cod, Mass. (*Deane*).

3. **L. rubéllus**, Moench. Stem rather obtusely 4-angled; leaves *petioled,* ovate-oblong or oblong-lanceolate, sharply serrate in the middle, *attenuate-acuminate at both ends* (3′ *long*); calyx-teeth triangular-subulate, *not rigid-pointed.* (L. Europæus, var. integrifolius, *Gray.*) — Penn. to Minn., and southward.

++ ++ *Outer bracts conspicuous; corolla hardly exceeding the calyx.*

4. **L. lùcidus**, Turcz., var. **Americànus**, Gray. Stem strict, stout, 2–3° high; leaves lanceolate and oblong-lanceolate (2–4′ long), acute or acuminate, very sharply and coarsely serrate, sessile or nearly so; calyx-teeth attenuate-subulate. — Sask. and Minn. to Kan., thence west to Calif.

* * *Not stoloniferous; leaves incised or pinnatifid.*

5. **L. sinuàtus**, Ell. Stem erect, 1–3° high, acutely 4-angled; leaves oblong or lanceolate (1½–2′ long), acuminate, irregularly incised or laciniate-pinnatifid, or some of the upper merely sinuate, tapering to a slender petiole; calyx-teeth short-cuspidate; sterile filaments slender, conspicuous, with globular or spatulate tips. (L. Europæus, var. sinuatus, *Gray.*) — Common.

## 9. CUNÌLA, L. DITTANY.

Calyx ovate-tubular, equally 5-toothed, very hairy in the throat. Corolla 2-lipped; upper lip erect, flattish, mostly notched; the lower spreading, 3-cleft. Stamens 2, erect, exserted, distant; sterile filaments short, minute. — Perennials, with small white or purplish flowers, in corymbed cymes or clusters. (An ancient Latin name, of unknown origin.)

1. **C. Mariàna,** L. (COMMON DITTANY.) Stems tufted, corymbosely much branched (1° high); leaves smooth, ovate, serrate, rounded or heart-shaped at base, nearly sessile, dotted (1′ long); cymes peduncled; calyx striate. — Dry hills, southern N. Y. to S. Ind., south to Ga. and Ark.

## 10. HYSSÒPUS, Tourn. HYSSOP.

Calyx tubular, 15-nerved, equally 5-toothed, naked in the throat. Corolla short, 2-lipped; upper lip erect, flat, obscurely notched, the lower 3-cleft, with the middle lobe larger and 2-cleft. Stamens 4, exserted, diverging. — Perennial herb, with wand-like simple branches, lanceolate or linear entire leaves, and blue-purple flowers in small clusters, crowded in a spike. (The ancient name.)

**H.** OFFICINÀLIS, L. — Roadsides, etc., sparingly escaped from gardens. (Adv. from Eu.)

## 11. PYCNÁNTHEMUM, Michx. MOUNTAIN MINT. BASIL.

Calyx ovate-oblong or tubular, about 13-nerved, equally 5-toothed, or the three upper teeth more or less united, naked in the throat. Corolla short, more or less 2-lipped; the upper lip straight, nearly flat, entire or slightly notched; the lower 3-cleft, its lobes all ovate and obtuse. Stamens 4, distant, the lower pair rather longer; anther-cells parallel. — Perennial upright herbs, with a pungent mint-like flavor, corymbosely branched above, the floral leaves often whitened; the many-flowered whorls dense, crowded with bracts, and usually forming terminal heads or close cymes. Corolla whitish or purplish, the lips mostly dotted with purple. Fl. summer and early autumn. — Varies, like the Mints, with the stamens exserted or included in different flowers. (Name composed of *πυκνός, dense,* and *ἄνθεμον, a blossom,* from the dense inflorescence.)

* *Bracts and equal calyx-teeth awn-tipped, rigid, naked, as long as the corolla; flowers in rather dense mostly terminal heads; leaves rigid, slightly petioled.*

1. **P. aristàtum,** Michx. Minutely hoary-puberulent (1–2° high); leaves ovate-oblong and oblong-lanceolate, acute, sparingly denticulate-serrate (1–2′ long), roundish at the base. — Pine barrens, N. J. to Fla. and La.

Var. **hyssopifòlium,** Gray. Leaves narrowly oblong or broadly linear, nearly entire and obtuse. — Va. to Fla.

* * *Bracts and equal and similar calyx-teeth not awned.*

+ *Leaves linear or lanceolate, nearly sessile, entire, very numerous; capitate glomerules small and numerous, densely cymose, imbricated with many short appressed rigid bracts.*

2. **P. lanceolàtum,** Pursh. *Smoothish or minutely pubescent* (2° high); *leaves lanceolate or lance-linear,* obtuse at base; *heads downy;* bracts ovate or lanceolate; *calyx-teeth short and triangular.* — Dry thickets, Mass. to Dak., south to Ga. and Ark.

3. **P. linifòlium,** Pursh. *Smoother and leaves narrower* and heads less downy than in the last; the narrower *bracts and lance-awl-shaped calyx-teeth pungently pointed.* — Dry ground, Mass. to Minn., south to Fla. and Tex.

+ + *Leaves lanceolate to ovate, sessile or nearly so, denticulate or entire; heads larger and fewer, with fewer and looser bracts.*

4. **P. mùticum,** Pers. *Minutely hoary* throughout, or becoming almost smooth, corymbosely much branched (1 – 2½° high); *leaves ovate or broadly ovate-lanceolate,* varying to lanceolate, *rather rigid, acute, rounded or slightly heart-shaped at base,* mostly sessile and minutely sharp-toothed, prominently veined, green when old; *the floral ones,* short bracts, and triangular or ovate calyx-teeth, *hoary with a fine close down;* flower-clusters very dense. — Maine to S. Ill., south to Fla. and Ark.

Var. **pilòsum,** Gray. Hoary with loose pubescence; leaves thinner, oblong-lanceolate, mostly acute or acutish at base; bracts and especially the narrower (often somewhat unequal) calyx-teeth often villous-pubescent. (P. pilosum, *Nutt.*) — Ohio to Iowa, Kan., and Ark.

5. **P. léptodon,** Gray. *Soft-pubescent,* or glabrate below, loosely branched; *leaves membranaceous, green* (1½ – 2′ long), *lanceolate or oblong-lanceolate,* subsessile; clusters larger and looser, canescent-hirsute; *long-acuminate bracts and calyx-teeth slender-subulate, villous-hirsute.* — S. Mo. to northwestern N. C.

+ + + *Leaves linear- or oblong-lanceolate, short-petioled, not at all hoary; flowers in mostly terminal dense capitate clusters; calyx hoary-pubescent.*

6. **P. Torrèyi,** Benth. *Puberulent;* stem strict and nearly simple (2 – 3° high); *leaves thin, linear-lanceolate,* tapering to both ends (mostly 2′ long and 2 – 3″ wide), *nearly entire;* heads small; awl-shaped calyx-teeth and mostly appressed bracts canescent. — Dry soil, southern N. Y. to Penn. and Del.

7. **P. clinopodioìdes,** Gray. *Pubescent; leaves broadly or oblong-lanceolate, sharply denticulate* (sometimes entire); heads fewer and larger; bracts loose. — Dry soil, southern N. Y. to E. Penn.

* * * *Calyx bilabiate* (3 *upper teeth united*), *the teeth and the tips of the loose bracts not rigid; flowers in dense flattened glomerate cymes; leaves thin, mostly serrate, petioled, the uppermost more or less canescent.*

8. **P. Túllia,** Benth. Leaves greener and *loosely soft-downy,* only the floral ones whitened, otherwise resembling those of the next; cymes dense; *bracts much surpassing the flowers,* their long awn-like points and the awn-pointed calyx-teeth bearded with long loose hairs. — S. Va. and N. C. to Tenn. and Ga.

9. **P. incànum,** Michx. *Leaves* ovate-oblong, acute, remotely toothed, *downy above and mostly hoary with whitish wool underneath, the uppermost whitened both sides; cymes open;* bracts linear-awl-shaped and, with the calyx-teeth, more or less awn-pointed. — N. Eng. to Ont. and Ind., south to Fla. and Tex.

* * * * *Calyx equally* 5-*toothed; heads few, large and globose* (*terminal and in the upper axils of the thin petioled leaves*); *bracts loose, ciliate-bearded.*

10. **P. montànum,** Michx. Stem (1 – 3° high) and ovate- or oblong-lanceolate serrate leaves glabrous; bracts very acute or awl-pointed, the outermost ovate and leaf-like, the inner linear; teeth of the tubular calyx short and acute. — Alleghanies, from S. Va. and Tenn. to Ga. and Ala.

## 12. ORÍGANUM, Tourn. WILD MARJORAM.

Calyx ovate-bell-shaped, hairy in the throat, striate, 5-toothed. Tube of the corolla about the length of the calyx, 2-lipped; the upper lip rather erect and slightly notched, the lower longer, of 3 nearly equal spreading lobes. Stamens 4, exserted, diverging. — Perennials, with nearly entire leaves, and purplish flowers crowded in cylindrical or oblong spikes, imbricated with colored bracts. (An ancient Greek name, composed of *ὄρος*, *a mountain*, and *γάνος*, *delight*.)

**O.** vulgàre, L. Upright, hairy, corymbose at the summit; leaves petioled, round-ovate; bracts ovate, obtuse, purplish. — Roadsides, Atlantic States. June – Oct. (Nat. from Eu.)

## 13. THỲMUS, Tourn. THYME.

Calyx ovate, 2-lipped, 13-nerved, hairy in the throat; the upper lip 3-toothed, spreading; the lower 2-cleft, with the awl-shaped divisions ciliate. Corolla short, slightly 2-lipped; the upper lip straight and flattish, notched at the apex, the lower 3-cleft. Stamens 4, straight and distant, usually exserted. — Low perennials, with small and entire strongly-veined leaves, and purplish or whitish flowers. (The ancient Greek name of the Thyme, probably from *θύω*, *to burn perfume*, because it was used for incense.)

**T.** Serpýllum, L. (Creeping Thyme.) Prostrate; leaves green, flat, ovate, entire, short-petioled; flowers crowded at the ends of the branches. — Old fields, E. Mass. to Penn. (Adv. from Eu.)

## 14. SATURÈIA, Tourn. SAVORY.

Calyx bell-shaped, 10-nerved, equally 5-toothed, naked in the throat. Corolla 2-lipped; the upper lip erect, flat, nearly entire, the lower 3-cleft. Stamens 4, somewhat ascending. — Aromatic plants, with narrow entire leaves, often clustered, and somewhat spiked purplish flowers. (The ancient Latin name.)

**S.** horténsis, L. (Summer Savory.) Pubescent annual; clusters few-flowered; bracts small or none. — Escaping from gardens and sparingly wild in Ohio to Ill., etc. (Adv. from Eu.)

## 15. CALAMÍNTHA, Tourn. CALAMINT.

Calyx tubular, 13-nerved, mostly hairy in the throat, 2-lipped; the upper lip 3-cleft, the lower 2-cleft. Corolla with a straight tube and an inflated throat, distinctly 2-lipped; the upper lip erect, flattish, entire or notched; the lower spreading, 3-parted, the middle lobe usually largest. Stamens 4, mostly ascending; the anthers usually approximate in pairs. — Perennials, with mostly purplish or whitish flowers, produced all summer; inflorescence various. (Name composed of *καλός*, *beautiful*, and *μίνθα*, *Mint*.)

§ 1. *Flowers loose, without long-subulate bracts; calyx villous in the throat.*

* *Pubescent; peduncles short but mostly distinct; bracts minute.*

**C.** Népeta, Link. (Basil-Thyme.) Soft-hairy; stem ascending (1 – 3° high); leaves petioled, broadly ovate, obtuse, crenate; corolla (3′′ long) twice the length of the calyx. — Dry waste grounds, Md. to Ark. (Nat. from Eu.)

* * *Glabrous or nearly so; common peduncles hardly any; pedicels* 1 – 5, *slender, the conspicuous bracts subulate-acuminate; on wet limestone river-banks.*

1. **C. glabélla,** Benth. Smooth; *stems diffuse or spreading* (1 – 2° *long*); leaves slightly petioled, *oblong or oblong-linear*, narrowed at base (8′′ – 2′ long), *sparingly toothed* or nearly entire; clusters 3 – 5-flowered; corolla (purplish, 5 – 6′′ long) fully twice the length of the calyx. — S. Ind., Ky., and Tenn.

2. **C. Nuttàllii,** Gray. Smaller; the flowering stems more upright (5 – 9′ high), *with narrower mostly entire leaves and fewer-flowered clusters, while sterile runners from the base bear ovate thickish leaves only* 2 – 5″ *long.* (C. glabella, var. Nuttallii, *Gray.*) — Niagara Falls to Minn., south to Mo. and Tex.

§ 2. *Flowers in sessile dense many-flowered clusters, and involucrate with conspicuous setaceous-subulate rigid bracts; calyx nearly naked in the throat.*

3. **C. Clinopòdium,** Benth. (Basil.) Hairy, erect (1 – 2° high); leaves ovate, petioled, nearly entire; flowers (pale purple) in globular clusters; hairy bracts as long as the calyx. — Borders of thickets and fields, naturalized extensively, but indigenous from the Great Lakes to the Rocky Mts. (Eu., Asia.)

### 16. MELÍSSA, L. Balm.

Calyx with the upper lip flattened and 3-toothed, the lower 2-cleft. Corolla with a recurved-ascending tube. Stamens 4, curved and conniving under the upper lip. Otherwise nearly as Calamintha. — Clusters few-flowered, loose, one-sided, with few and mostly ovate bracts resembling the leaves. (Name from μέλισσα, *a bee;* the flowers yielding abundance of honey.)

**M.** officinàlis, L. (Common Balm.) Upright, branching, perennial, pubescent; leaves broadly ovate, crenate-toothed, lemon-scented; corolla nearly white. — Sparingly escaped from gardens. (Nat. from Eu.)

### 17. HEDEÒMA, Pers. Mock Pennyroyal.

Calyx ovoid or tubular, gibbous on the lower side near the base, 13-nerved, bearded in the throat, 2-lipped; upper lip 3-toothed, the lower 2-cleft. Corolla 2-lipped; upper lip erect, flat, notched at the apex, the lower spreading, 3-cleft. Fertile stamens 2; the upper pair reduced to sterile filaments or wanting. — Low, odorous annuals, with small leaves, and loose axillary clusters of flowers (in summer), often forming terminal leafy racemes. (Altered from ἡδυόσμον, an ancient name of Mint, from its sweet scent.)

* *Sterile filaments manifest; leaves oblong-ovate, petioled, somewhat serrate.*

1. **H. pulegioìdes,** Pers. (American Pennyroyal.) Erect, branching, hairy; whorls few-flowered; upper calyx-teeth triangular, the lower setaceous-subulate; corolla (bluish, pubescent) scarcely exserted (2 – 3″ long); taste and odor nearly of the true *Pennyroyal* (Mentha Pulègium) of Europe. — Common from N. Eng. to Dak., and southward.

* * *Sterile filaments minute or obsolete; leaves narrow, entire, sessile or nearly so.*

2. **H. híspida,** Pursh. Mostly low; *leaves linear, crowded, almost glabrous,* somewhat hispid-ciliate; *bracts spreading or reflexed;* upper flowers rather crowded; *calyx-teeth all subulate,* equalling the bluish corolla. — Plains, Minn. and Dak. to W. Ill. and La.

3. **H. Drummóndi,** Benth. *Pubescent or puberulent,* a span or two high; *leaves oblong to linear; bracts mostly erect;* calyx hirsute or hispid, its teeth at length connivent, *the lower nearly twice as long as the upper.* — Central Neb. and Kan. to Tex., and westward.

### 18. SÁLVIA, L. Sage.

Calyx 2-lipped; upper lip 3-toothed or entire, the lower 2-cleft. Corolla deeply 2-lipped, ringent; upper lip straight or scythe-shaped, entire or barely notched, the lower spreading or pendent, 3-lobed, its middle lobe larger. Stamens 2, on short filaments, jointed with the elongated transverse connective, one end of which, ascending under the upper lip, bears a linear 1-celled (half) anther, the other, usually descending, bears an imperfect or deformed (half) anther or none at all. — Flowers mostly large and showy, in spiked, racemed, or panicled whorls, produced in summer. (Name from *salvo*, to save, in allusion to the reputed healing qualities of Sage.)

* *Both anther-cells polliniferous; leaves mostly lyrately lobed or pinnatifid.*

1. **S. lyràta,** L. (LYRE-LEAVED SAGE.) Low perennial (10–20′ high), somewhat hairy; stem nearly simple and naked; root-leaves lyre-shaped or sinuate-pinnatifid, sometimes almost entire; those of the stem mostly a single pair, smaller and narrower; the floral oblong-linear, not longer than the calyx; whorls loose and distant, forming an interrupted raceme; upper lip of the blue-purple pubescent corolla (nearly 1′ long) short, straight, not vaulted. — Woodlands and meadows, N. J. to Ill., south to Fla. and Tex.

* * *Lower anther-cell wanting; the sterile ends of the connectives mostly united.*

+ *Calyx obscurely bilabiate; corolla 8–12″ long, with prominently exserted tube.*

2. **S. azùrea,** Lam., var. **grandiflòra,** Benth. Cinereous-puberulent, 1–5° high; lower leaves lanceolate or oblong, obtuse, denticulate or serrate, tapering to a short petiole; upper narrower, often linear, entire; inflorescence spike-like, tomentulose sericeous; calyx-teeth short, the broad upper lip entire; corolla deep blue (varying to white). — E. Neb. to Miss., Tex., and Col.

+ + *Calyx deeply bilabiate; corolla 4–6″ long, the tube hardly at all exserted.*

3. **S. lanceolàta,** Willd. *Puberulent* or nearly glabrous, 5–12′ high; *leaves lanceolate or linear-oblong,* irregularly serrate or nearly entire, *tapering to a slender petiole;* inflorescence virgate-spiciform, interrupted; *upper lip of calyx entire,* lower 2-cleft; corolla blue, 4″ long, *little exserted; style glabrous or nearly so.* — Plains, Iowa and Neb. to Tex. and Ariz.

4. **S. urticifòlia,** L. *Villous-pubescent and somewhat viscid,* or glabrate, 1–2° high; *leaves* coarsely serrate, *ovate, with truncate or cuneate base decurrent into a winged petiole;* inflorescence racemose-spicate, of numerous distant clusters; calyx-lips divergent, *the upper 3-toothed,* lower 2-cleft; corolla blue and white, 5–6″ long, *twice the length of the calyx; style strongly bearded.* — Woodlands, Md. to Ky., south to Ga. and La.

**S.** SCLÀREA, L. (CLARY.) Villous-pubescent, viscid, stout, 2–3° high; leaves ample, long-petioled, ovate and cordate, crenate, rugose; the floral forming bracts of the spike, tinged with white and rose-color; corolla white and bluish, rather large, the long upper lip falcate and compressed. — Escaped from gardens, Penn. (Nat. from Eu.)

**S.** VERBENÀCEA, L. Pubescent or villous, 1–2° high; leaves ovate or oblong, often cordate at base, mostly sinuate-incised or moderately pinnatifid, the lobes crenate-toothed, rugose; the few cauline mostly sessile, the floral inconspicuous; raceme interrupted; calyx reflexed after flowering; corolla bluish, small, the upper lip nearly straight. — Sparingly seen in the Middle States. (Nat. from Eu.)

### 19. MONÁRDA, L. HORSE-MINT.

Calyx tubular, elongated, 15 nerved, nearly equally 5-toothed, usually hairy in the throat. Corolla elongated, with a slightly expanded throat, and a strongly 2-lipped limb; lips linear or oblong, somewhat equal, the upper erect, entire or slightly notched, the lower spreading, 3-lobed at the apex, its lateral lobes ovate and obtuse, the middle one narrower and slightly notched. Stamens 2, elongated, ascending, inserted in the throat of the corolla; anthers linear (the divaricate cells confluent at the junction). — Odorous erect herbs, with entire or toothed leaves, and pretty large flowers in a few whorled heads, closely surrounded with bracts. (Dedicated to *Nicolas Monardes,* author of many tracts upon medicinal and other useful plants, especially those of the New World, in the latter half of the 16th century.)

* *Stamens and style exserted beyond the linear straight acute upper lip of the corolla; heads solitary and terminal or sometimes 2 or 3; leaves acutely more or less serrate; perennials.*

+- *Leaves petioled; calyx-teeth scarcely longer than the width of the tube.*

1. **M. dídyma,** L. (OSWEGO TEA. BEE-BALM.) Somewhat hairy (2° high), acutely 4-angled; leaves ovate-lanceolate, acuminate, *the floral ones and the large outer bracts tinged with red; calyx smooth, incurved, nearly naked in the throat: corolla smooth* (2′ *long*), *bright red,* showy. — Moist woods by streams, N. Eng. to Mich., south to Ga. in the mountains. July – Aug.

2. **M. clinopòdia,** L. Nearly glabrous to villous-pubescent; leaves ovate-lanceolate and ovate; *bracts whitish; calyx moderately hirsute in the throat: corolla slightly pubescent* (1′ *long*), *dull white or flesh-colored.* — Shady places, ravines, etc., Ont. to Ill., and along the mountains to Ga.

3. **M. fistulòsa,** L. (WILD BERGAMOT.) Smoothish or downy, 2 – 5° high; *leaves* ovate-lanceolate, the uppermost and outer bracts somewhat colored (whitish or purplish); *calyx* slightly curved, *very hairy in the throat; corolla* (1′ long or more) *purple or purplish dotted,* smooth or hairy. — Dry soil, Vt. and E. Mass. to Fla., and far westward. Very variable; the following are the more marked forms. — Var. RÙBRA, Gray. Corolla bright crimson or rose-red; habit of n. 1, but upper lip of corolla villous-bearded on the back at tip; throat of calyx with the outer bristly hairs widely spreading. In moist ground, Alleghany Mts. — Var. MÈDIA, Gray. Corolla deep purple. Alleghany Mts. — Var. MÓLLIS, Benth. Corolla flesh-color to lilac, glandular, its upper lip hairy outside or more bearded at the tip; leaves paler, soft-pubescent beneath; throat of calyx mostly filled with dense beard, with sometimes an outer row of bristles. Extends to Minn. and westward.

+- +- *Leaves nearly sessile; calyx-teeth elongated, lax; head solitary.*

4. **M. Bradburiàna,** Beck. Leaves clothed with long soft hairs, especially underneath; the floral and the outer bracts somewhat heart-shaped, purplish; calyx smoothish, contracted above, very hairy in the throat, with awl-shaped awned teeth; corolla smoothish, bearded at the tip of the upper lip, scarcely twice the length of the calyx, pale-purplish, the lower lip dotted with purple. — Thickets, Ind. to Tenn. and Kan.

* * *Stamens not exceeding the falcate upper lip of the short corolla; heads axillary or interrupted spicate; leaves lanceolate or oblong, sparsely serrate, tapering into the petiole.*

5. **M. punctàta,** L. (HORSE-MINT.) *Perennial,* minutely downy (2 – 3° high); leaves petioled, lanceolate, narrowed at base; *bracts* lanceolate,

blunt, obtuse at base, sessile, yellowish and purple; teeth of the downy calyx *short and awnless*, rigid, soon spreading; corolla nearly smooth, *yellowish*, the upper lip *spotted with purple*, notched at the apex, the tube scarcely exceeding the calyx. — Sandy ground, N. Y. to Minn., south to Fla. and Tex.

6. **M. citriodòra**, Cerv. *Annual*, 1 – 3° high; bracts narrowly oblong, *their slender awned tips spreading or recurving; calyx-teeth slender*, at length usually spreading; corolla *white or pinkish, not spotted.* — Neb. to Tex.

## 20. BLEPHÍLIA, Raf.

Calyx ovoid-tubular, 13-nerved, 2-lipped, naked in the throat; upper lip with 3 awned teeth, the lower with 2 nearly awnless teeth. Corolla inflated in the throat, strongly and nearly equally 2-lipped; upper lip erect, entire, the lower spreading, 3-cleft, its lateral lobes ovate and rounded, larger than the oblong and notched middle one. Stamens 2, ascending, exserted (the upper pair minute or none); anthers, etc., as in Monarda. — Perennial herbs, with nearly the foliage, etc., of Monarda; the small pale bluish purple flowers crowded in axillary and terminal globose whorls; in summer. (Name from *βλεφαρίς*, *the eyelash*, in reference to the hairy-fringed bracts and calyx-teeth.)

1. **B. ciliàta**, Raf. Somewhat downy (1 – 2° high); *leaves almost sessile, oblong-ovate, narrowed at base*, whitish-downy underneath; outer *bracts ovate*, acute, colored, ciliate, as long as the calyx; corolla hairy. — Dry open places, Mass. to Minn., south to Ga. and Kan.

2. **B. hirsùta**, Benth. Taller, hairy throughout; *leaves long-petioled, ovate, pointed, rounded or heart-shaped at base;* the lower floral ones similar, the uppermost and the *bracts linear-awl-shaped*, shorter than the long-haired calyx; corolla smoothish, pale, with darker purple spots. — Moist shady places, Vt. to Minn., south to Ga. and E. Tex.

## 21. LOPHÁNTHUS, Benth. GIANT HYSSOP.

Calyx tubular-bell-shaped, 15-nerved, oblique, 5-toothed, the upper teeth rather longer than the others. Corolla 2-lipped; upper lip nearly erect, 2-lobed, the lower somewhat spreading, 3-cleft, with the middle lobe crenate. Stamens 4, exserted; the upper pair declined, the lower and shorter pair ascending, so that the pairs cross; anther-cells nearly parallel. — Perennial tall herbs, with petioled serrate leaves, and small flowers crowded in interrupted terminal spikes; in summer. (Name from *λόφος*, *a crest*, and *ἄνθος*, *a flower.*)

1. **L. nepetoìdes**, Benth. Stem stout, 2½ – 6° high, sharply 4-angled, *smooth*, or nearly so; leaves ovate, somewhat pointed, coarsely crenate-toothed (2 – 4′ long); spikes 2 – 6′ long, crowded with the ovate pointed bracts; *calyx-teeth ovate, rather obtuse, little shorter than the pale greenish-yellow corolla.* — Borders of woods, Vt. to Minn., south to N. C. and Tex.

2. **L. scrophulariæfòlius**, Benth. Stem (obtusely 4-angled) and lower surface of the ovate or somewhat heart-shaped acute leaves more or less *pubescent; calyx-teeth lanceolate, acute, shorter than the purplish corolla* (spikes 4 – 15′ long); otherwise like the last. — Same range.

3. **L. anisàtus**, Benth. Smooth, but the ovate acute *leaves glaucous white underneath* with minute down; *calyx-teeth lanceolate, acute.* — Plains, Wisc. to Minn., Neb., and westward. — Foliage with the scent of anise.

### 22. CEDRONÉLLA, Moench.

Calyx rather obliquely 5-toothed, many-nerved. Corolla ample, expanded at the throat, 2-lipped; the upper lip flattish or concave, 2-lobed, the lower 3-cleft, spreading, the middle lobe largest. Stamens 4, ascending, the lower pair shorter; anther-cells parallel. — Sweet-scented perennials, with pale purplish flowers. (Name a diminutive of *cedrus*, the cedar-tree, from the aromatic leaves of C. triphylla, the *Balm-of-Gilead* of English gardens.)

1. **C. cordàta,** Benth Low, with slender runners, hairy; leaves broadly heart-shaped, crenate, petioled, the floral shorter than the calyx; whorls few-flowered, at the summit of short ascending stems; corolla hairy inside (1½′ long); stamens shorter than the upper lip. — Moist shady banks, W. Penn. to Ky., south to the mountains of N. C. and Tenn.

### 23. NÉPETA, L. CAT-MINT.

Calyx tubular, often incurved, obliquely 5-toothed. Corolla dilated in the throat, 2-lipped; the upper lip erect, rather concave, notched or 2-cleft; the lower spreading, 3-cleft, the middle lobe largest, either 2-lobed or entire. Stamens 4, ascending under the upper lip, the lower pair shorter; anthers approximate in pairs, the cells divergent. — Perennial herbs. (The Latin name, thought to be derived from *Nepete*, an Etrurian city.)

§ 1. *Cymose clusters rather dense and many-flowered, forming interrupted spikes or racemes: upper floral leaves small and bract-like.*

**N.** CATÀRIA, L. (CATNIP.) Downy, erect, branched; leaves heart-shaped, oblong, deeply crenate, whitish-downy underneath; corolla whitish, dotted with purple. — Near dwellings; a very common weed. July – Sept. (Nat. from Eu.)

§ 2. GLECHÒMA. *Leaves all alike; the axillary clusters loosely few-flowered.*

**N.** GLECHÒMA, Benth. (GROUND IVY. GILL-OVER-THE-GROUND.) Creeping and trailing; leaves petioled, round kidney-shaped, crenate, green both sides; corolla thrice the length of the calyx, light blue. — Damp or shady places, common. (Nat. from Eu.)

### 24. DRACOCÉPHALUM, Tourn. DRAGON-HEAD.

Calyx tubular, 13 – 15-nerved, straight, 5-toothed; the upper tooth usually much the largest. Corolla 2-lipped; the upper lip slightly arched and notched: the lower spreading, 3-cleft, with its middle lobe largest and 2-cleft or notched at the end. Stamens 4, ascending under the upper lip, the lower pair shorter. anthers approximate by pairs, the cells divergent. — Whorls many-flowered, mostly spiked or capitate, and with awn-toothed or fringed leafy bracts. (Name from δράκων, *a dragon*, and κεφαλή, *head*, alluding to the form of the corolla in the original species.)

1. **D. parviflòrum,** Nutt. Annual or biennial; stem erect, leafy (8 - 20′ high); leaves ovate-lanceolate, sharply cut-toothed, petioled; whorls crowded in a terminal head or spike; upper tooth of the calyx ovate, nearly equalling the bluish small slender corolla. — Rocky or gravelly soil, northern N. Y. to Iowa and Minn., and westward.

### 25. SCUTELLÀRIA, L. SKULLCAP.

Calyx bell-shaped in flower, 2-lipped; the lips entire, closed in fruit, the upper with a helmet-like at length concave and enlarged appendage on the back (the upper sepal); calyx splitting to the base at maturity, the upper lip usually falling away. Corolla with an elongated curved ascending tube, dilated at the throat, 2-lipped; the upper lip arched, entire or barely notched, the lateral lobes mostly connected with the upper rather than the lower lip; the lower lobe or lip spreading and convex, notched at the apex. Stamens 4, ascending under the upper lip; anthers approximate in pairs, ciliate or bearded, those of the lower stamens 1-celled (halved), of the upper 2-celled and heart shaped. — Bitter perennial herbs, not aromatic, the short peduncles or pedicels chiefly opposite, 1-flowered, often 1-sided, axillary or spiked or racemed; in summer. (Name from *scutella*, a dish, in allusion to the appendage to the fruiting calyx.)

§ 1. *Nutlets wingless, mostly marginless, on a low gynobase.*

∗ *Flowers small* (3″ *long*), *in axillary and sometimes terminal* 1-*sided racemes.*

1. **S. lateriflòra,** L. (MAD-DOG SKULLCAP.) Smooth; stem upright, much branched (1 – 2° high); leaves lanceolate-ovate or ovate-oblong, pointed, coarsely serrate, rounded at base, petioled (2 – 3′ long), the lower floral ones similar; flowers blue, rarely white. — Wet shaded places, common.

∗ ∗ *Flowers larger* (6 – 12″ *long*) *in terminal single or panicled racemes, the floral leaves gradually reduced to bracts.*

+ *Stem-leaves all cordate, crenate-toothed, slender-petioled; lateral lobes of the corolla almost equalling the short upper lip.*

2. **S. versícolor,** Nutt. *Soft hairy,* the hairs of the inflorescence, etc., partly viscid-glandular; stem mostly erect (1 – 3° high); *leaves ovate or round-ovate,* very veiny, *rugose,* the floral reduced to broadly ovate entire bracts about equalling the glandular-hairy calyx; racemes mostly simple; corolla bright blue with lower side and lip whitish. — Banks of streams, Penn. to Wisc., Minn., and southward. — Var. MÌNOR, Chapm. Low, slender, and thin-leaved; floral leaves small. — Mountains of Va., etc.

3. **S. saxátilis,** Riddell. *Glabrous or slightly hairy;* stem weak, ascending (6 – 18′ long), often producing runners, branched; *leaves ovate or ovate-oblong* (1 – 2′ long), *thin, obtuse;* upper bracts oblong or ovate, small, entire; raceme simple, loose. — Moist shaded banks, Del. to Ohio, south in the mountains to Va. and Tenn.

+ + *Stem-leaves crenate-dentate or serrate* (*or nearly entire in* n. 7), *only the lowest if any cordate at base, more or less petioled; lateral lobes of the blue corolla shorter than the galeate upper lip.*

4. **S. serràta,** Andrews. *Green and nearly glabrous:* stem rather simple (1 – 3° high), with single loosely flowered racemes; *leaves serrate, acuminate at both ends,* ovate or ovate-oblong; calyx, etc., somewhat hairy; *corolla* 1′ *long, narrow, its lips equal* in length. — Woods, Penn. to Ill. and N. C.

5. **S. canéscens,** Nutt. Stem branched above (2 – 4° high), with the *panicled many-flowered racemes, flowers, and the lower surface of the ovate or lance-ovate acute* (at the base acute, obtuse, or cordate) *crenate leaves whitish with fine soft down,* often becoming rather glabrous; bracts oblong or lanceolate; *corolla* 8 – 9″ *long.* — River-banks, Ont. and Penn. to the mountains of N. C. and N. Ala., west to Kan. and Ark.

6. **S. pilòsa,** Michx. *Pubescent with spreading hairs;* stem nearly simple (1 – 3° high); *leaves rather distant, crenate, oblong-ovate, obtuse* varying to

roundish-ovate, the lower abrupt or heart-shaped at base and long-petioled, the upper on short margined petioles, veiny; bracts oblong-spatulate; racemes short, often branched; *corolla 6″ long, rather narrow*, the lower lip a little shorter. — Dry or sterile ground, southern N. Y. to Mich., south to Fla. and Tex.

Var. **hirsùta,** Gray, is a large form (sometimes 3° high), more hirsute, with larger very coarsely crenate leaves (2 - 3′ long). — Richer soil, Ky.

Var. **ovalifòlia,** Benth., is a form with shorter and finer pubescence, and narrower less veiny leaves. — N. J. to Va.

7. **S. integrifòlia,** L. *Downy all over with a minute hoariness;* stem commonly simple (1 - 2° high); *leaves oblong-lanceolate or linear, mostly entire,* obtuse, very short-petioled; *corolla* 1′ long, *much enlarged above, the ample lips equal* in length. — Dry ground, N. Eng. to Fla. and Tex.

* * * *Flowers solitary in the axils of the upper mostly sessile leaves, which resemble the lower ones but are occasionally reduced.*

8. **S. Wrìghtii,** Gray. *Firm and woody at base, not stoloniferous nor tuberiferous,* low, many-stemmed in a tuft, minutely cinereous-puberulent, very leafy; leaves ovate or spatulate-oblong, entire, subsessile (½′ long), the upper floral shorter than the flowers; corolla pubescent (½′ long), usually violet. — Kan. to Tex.

9. **S. párvula,** Michx. Herbaceous; *subterranean stolons moniliform-tuberiferous;* minutely downy, dwarf (3 - 6′ high), branched and spreading; all but the lower leaves sessile and entire, the lowest round-ovate, the others ovate or lance-ovate, slightly heart-shaped (6 - 8″ long); corolla 2 - 4″ long. — Sandy banks, W. New Eng. to Minn., south to Fla. and Tex. — Var. MÓLLIS, Gray, is more spreading, softly pubescent throughout, with larger less firm leaves. — Sandy banks, S. Ill. to Kan.

10. **S. galericulàta,** L. *Herbaceous; subterranean stolons not tuberiferous;* smooth or a little downy, erect (1 - 2° high), simple; leaves ovate-lanceolate, acute, serrate, roundish and slightly heart-shaped at base (1 - 2′ long); corolla violet-blue, 8 - 9″ long, with slender tube, the large lower lip nearly erect. — Wet shady places; common especially northward. (Eu.)

§ 2. *Nutlets conspicuously winged, each raised on a slender base.*

11. **S. nervòsa,** Pursh. Smooth, simple or branched, slender, 10 - 20′ high; lower leaves roundish, the middle ovate, toothed, somewhat heart-shaped (1′ long), the floral ovate-lanceolate, entire; nerve-like veins prominent beneath; corolla bluish, 4″ long, the lower lip exceeding the concave upper one. — Moist thickets, N. Y. to Ind., south to Va. and Mo.

## 26. BRUNÉLLA, Tourn. SELF-HEAL.

Calyx tubular-bell-shaped, somewhat 10-nerved and reticulated-veiny, flattened on the upper side, naked in the throat, closed in fruit, 2-lipped; upper lip broad and flat, truncate, with 3 short teeth, the lower 2-cleft. Corolla ascending, slightly contracted at the throat and dilated at the lower side just beneath it, 2-lipped; upper lip erect, arched, entire; the lower reflexed-spreading, 3-cleft, its lateral lobes oblong, the middle one rounded, concave, denticulate. Stamens 4, ascending under the upper lip; filaments 2-toothed at the apex, the lower tooth bearing the anther; anthers approximate in pairs, their cells diverging. — Low perennials, with nearly simple stems, and 3-flowered clusters of flowers sessile in the axils of round and bract-like membranaceous floral leaves, imbricated in a close spike or head. (Name said to be from the German *braune*, a disease of the throat, for which this plant was a reputed remedy.)

1. **B. vulgàris,** L. (Common Self-heal or Heal-all.) Leaves ovate-oblong, entire or toothed, petioled, hairy or smoothish; corolla (violet or flesh-color, rarely white) not twice the length of the purplish calyx. — Woods and fields, Newf. to Fla., westward across the continent. June – Sept. (Eu.)

## 27. PHYSOSTÈGIA, Benth. False Dragon-head.

Calyx nearly equally 5-toothed, obscurely 10-nerved, short-tubular or bell-shaped, more or less enlarged and slightly inflated in fruit. Corolla funnelform, with a much inflated throat, 2-lipped; upper lip erect, nearly entire; the lower 3-parted, spreading, small, its middle lobe larger, broad and rounded, notched. Stamens 4, ascending under the upper lip; anthers approximate; the cells parallel. — Smooth perennials, with upright wand-like stems, and sessile lanceolate or oblong mostly serrate leaves. Flowers large and showy, rose or flesh-color variegated with purple, opposite, crowded in simple or panicled terminal leafless spikes. (Name from *φῦσα, a bladder*, and *στέγη, a covering*.)

1. **P. Virginiàna,** Benth. Stem 1 – 4° high, terminated by a simple virgate or several panicled spikes; leaves thickish; *calyx tubular-campanulate, its teeth half the length of the tube; corolla 1′ long.* — Wet grounds, from N. Vt. west and southward. Varies greatly. — Var. denticulàta, Gray. Slender and commonly low, with crenulate-denticulate or obscurely serrate leaves, and slender or loosely-flowered spikes. — Middle Atlantic States.

2. **P. intermèdia,** Gray. Slender, 1 – 3° high, remotely leaved; leaves linear-lanceolate, repand-denticulate; *spikes filiform,* rather remotely flowered; *calyx short and broadly campanulate, its teeth about as long as the tube; corolla* 5 – 6″ *long, much dilated upward.* — Barrens, W. Ky. and Ark. to La. and Tex.

## 28. SYNÁNDRA, Nutt.

Calyx bell-shaped, inflated, membranaceous, irregularly veiny, almost equally 4-toothed! Corolla with a long tube, much expanded above and at the throat; the upper lip slightly arched, entire, the lower spreading and 3-cleft, with ovate lobes, the middle one broadest and notched at the end. Stamens 4, ascending; filaments hairy; anthers approximate in pairs under the upper lip; the two upper each with one fertile and one smaller sterile cell, the latter cells cohering together (whence the name; from *σύν, together*, and *ἀνήρ*, for *anther*).

1. **S. grandiflòra,** Nutt. Hairy biennial, 1° high; lower leaves long-petioled, broadly ovate, heart-shaped, crenate, thin, the floral sessile, gradually reduced to bracts, each with a single sessile flower; corolla 1½′ long, yellowish-white. — Shady banks of streams, S. Ohio to Ill. and Tenn. In spring.

## 29. MARRÙBIUM, Tourn. Horehound.

Calyx tubular, 5 – 10-nerved, nearly equally 5 – 10-toothed, the teeth more or less spiny-pointed and spreading at maturity. Upper lip of the corolla erect, notched, the lower spreading, 3-cleft, its middle lobe broadest. Stamens 4, *included in the tube of the corolla.* — Whitish-woolly bitter-aromatic perennials, branched at the base, with rugose and crenate or cut leaves, and many-flowered axillary whorls. (A name of Pliny, from the Hebrew *marrob*, a bitter juice.)

**M.** VULGÀRE, L. (COMMON HOREHOUND.) Stems ascending; leaves round-ovate, petioled, crenate-toothed; whorls capitate; calyx with 10 recurved teeth, the alternate ones shorter; corolla small, white. — Escaped from gardens into waste places. (Nat. from Eu.)

### 30. BALLÒTA, L. FETID HOREHOUND.

Calyx nearly funnel-form; the 10-ribbed tube expanded above into a spreading regular border, with 5 – 10 teeth. Anthers exserted beyond the tube of the corolla, approximate in pairs. Otherwise much as in Marrubium. (The Greek name, of uncertain origin.)

**B.** NÌGRA, L. (BLACK HOREHOUND.) More or less hairy, but green, erect; the root perennial; leaves ovate, toothed; whorls many-flowered, dense; calyx-teeth 5, longer than the tube of the purplish corolla. — Waste places, N. Eng., Penn., etc. (Nat. from Eu.)

### 31. PHLÒMIS, Tourn. JERUSALEM SAGE.

Calyx tubular, 5 – 10-nerved, truncate or equally 5-toothed. Upper lip of the corolla arched; the lower spreading, 3-cleft. Stamens 4, ascending and approximate in pairs under the upper lip; the filaments of the upper pair *longer than the others* in P. tuberosa, with an awl-shaped appendage at base; anther-cells divergent and confluent. — Leaves rugose. Whorls dense and many-flowered, axillary, remote, bracted. (An old Greek name of a woolly plant.)

**P.** TUBERÒSA, L. Tall perennial (3 – 5° high), nearly smooth; leaves ovate-heart-shaped, crenate, petioled, the floral oblong-lanceolate; bracts awl-shaped, hairy; upper lip of the purple corolla densely bearded with white hairs on the inside. — S. shore of Lake Ontario, N. Y. June, July. (Nat. from Eu.)

### 32. LEONÙRUS, L. MOTHERWORT.

Calyx top-shaped, 5-nerved, with 5 nearly equal teeth which are awl-shaped, and when old rather spiny-pointed and spreading. Upper lip of the corolla oblong and entire, somewhat arched; the lower spreading, 3-lobed, its middle lobe larger, narrowly oblong-obovate, entire, the lateral ones oblong. Stamens 4, ascending under the upper lip; anthers approximate in pairs, the valves naked. Nutlets truncate and sharply 3-angled. — Upright herbs, with cut-lobed leaves, and close whorls of flowers in their axils; in summer. (Name from λέων, *a lion*, and οὐρά, *tail*, i. e. *Lion's-tail.*)

**L.** CARDÌACA, L. (COMMON MOTHERWORT.) Tall perennial; leaves long-petioled, the lower rounded, palmately lobed, the floral wedge-shaped at base, 3-cleft, the lobes lanceolate; upper lip of the pale purple corolla bearded. — Waste places, around dwellings. (Nat. from Eu.)

**L.** MARRUBIÁSTRUM, L. Tall biennial, with elongated branches; stem-leaves oblong-ovate, coarsely toothed; corolla (whitish) shorter than the calyx-teeth, the tube naked within; lower lip rather erect. — Roadsides, N. J. to Del., and southward. (Adv. from Eu.)

**L.** SIBÍRICUS, L. Tall biennial; leaves 3-parted, the divisions 2 – 5-cleft, or deeply 3 – 7-cleft and incised; corolla (purplish) twice as long as the calyx, the upper lip fornicate, the lower little spreading. — Waste grounds, Penn.; also far west. (Adv. from Eu. and Asia.)

### 33. LÀMIUM, L. DEAD-NETTLE.

Calyx tubular-bell-shaped, about 5-nerved, with 5 nearly equal awl-pointed teeth. Corolla dilated at the throat; upper lip ovate or oblong, arched, narrowed at the base; the middle lobe of the spreading lower lip broad, notched at the apex, contracted as if stalked at the base, the lateral ones small, at the margin of the throat. Stamens 4, ascending under the upper lip; anthers approximate in pairs, 2-celled, the cells divergent. Nutlets truncate. — Decumbent herbs, the lowest leaves small and long-petioled, the middle heart-shaped and doubly toothed, the floral subtending the whorled flower-cluster; spring to autumn. (Name from λαιμός, *throat*, in allusion to the ringent corolla.)

* *Annuals or biennials, low; flowers small, purple, in few whorls or heads.*

**L.** AMPLEXICAÙLE, L. Leaves rounded, deeply crenate-toothed or cut, the *upper ones clasping;* corolla elongated, upper lip bearded, the lower spotted; lateral lobes truncate. — Rather common. (Nat. from Eu.)

**L.** PURPÙREUM, L. *Leaves* roundish or oblong, heart-shaped, crenate-toothed, *all petioled.* — N. Eng. and Penn. (Nat. from Eu.)

* * *Perennial, taller; flowers larger, in several axillary whorls.*

**L.** ÁLBUM, L. Hairy; leaves ovate, heart-shaped, petioled; calyx-teeth very slender, spreading; corolla white, the tube curved upward, obliquely contracted near the base, where there is a ring of hairs inside; lateral lobes of lower lip bearing a long slender tooth. — E. New Eng. (Nat. from Eu.)

**L.** MACULÀTUM, L. Like the last, but leaves more frequently marked with a white spot on the upper face, and flowers purplish, with the ring of hairs transverse instead of oblique. — Sparingly escaped. (Adv. from Eu.)

## 34. GALEÓPSIS, L. HEMP-NETTLE.

Calyx tubular-bell-shaped, about 5-nerved, with 5 somewhat equal and spiny-tipped teeth. Corolla dilated at the throat; upper lip ovate, arched, entire; the lower 3-cleft, spreading, the lateral lobes ovate, the middle one inversely heart-shaped; palate with 2 teeth at the sinuses. Stamens 4, ascending under the upper lip; *anther-cells transversely 2-valved;* the inner valve of each cell bristly-fringed, the outer one larger and naked. — Annuals, with spreading branches, and several – many-flowered whorls in the axils of floral leaves which are nearly like the lower ones. (Name composed of γαλέη, *a weasel,* and ὄψις, *resemblance,* from some fancied likeness of the corolla to the head of a weasel.)

**G.** TETRÀHIT, L. (COMMON HEMP-NETTLE.) *Stem swollen below the joints, bristly-hairy; leaves ovate,* coarsely serrate; corolla purplish or variegated, about twice the length of the calyx; or, in var. GRANDIFLÒRA, 3 – 4 times the length of the calyx, often yellowish with a purple spot on the lower lip. — Waste places, common. Aug., Sept. (Nat. from Eu.)

**G.** LÁDANUM, L. (RED H.) *Stem smooth or pubescent; leaves oblong-lanceolate,* more or less downy; corolla red or rose-color (often spotted with yellow), much exceeding the calyx. — E. New Eng., rare. Aug. (Adv. from Eu.)

## 35. STÀCHYS, Tourn. HEDGE-NETTLE.

Calyx tubular-bell-shaped, 5 – 10-nerved, equally 5-toothed, or the upper teeth united to form an upper lip. Corolla not dilated at the throat; upper lip erect or rather spreading, often arched, entire or nearly so; the lower usually longer and spreading, 3-lobed, with the middle lobe largest and nearly entire. Stamens 4, ascending under the upper lip (often reflexed on the throat after flowering); anthers approximate in pairs. Nutlets obtuse, not truncate.— Whorls 2 – many-flowered, approximate in a terminal raceme or spike (whence the name, from στάχυς, *a spike*). Flowers purple or rose-red, in summer.

* *Root annual; stems decumbent, low.*

**S.** ARVÉNSIS, L. (WOUNDWORT.) Hairy; leaves petioled, cordate-ovate, obtuse, crenate; whorls 4 – 6-flowered, distant; corolla (purplish) scarcely longer than the unarmed calyx. — Waste places, E. Mass. (Adv. from Eu.)

* * *Root perennial; stem erect.*

+- *Leaves obscurely or not at all cordate, sessile or short-petioled.*

1. **S. hyssopifòlia,** Michx. *Smooth and glabrous,* or the nodes hirsute; stems slender (1° high); *leaves linear-oblong or narrowly linear, sessile,* obscurely toothed toward the apex; whorls 4 – 6-flowered, rather distant; *corolla glabrous,* twice or thrice the length of the triangular-awl-shaped spreading calyx-teeth. — Wet sandy places, Mass. to Mich., south to Fla. and Mo. — Var. AMBÍGUA, Gray, is stouter (1 – 2° high), sometimes with scattered retrorse bristles on the angles of the stem, and with broader (3 – 6″) serrulate leaves. — Ill. and Ky. to Ga.

2. **S. palústris,** L. Stem 4-angled (2 – 3° high), leafy, *hirsute with spreading or reflexed hairs,* especially on the angles; *leaves* sessile, or the lower short-petioled, *oblong- or ovate-lanceolate, crenately serrate,* rounded at base, *downy or hairy-pubescent,* obtusish (2 – 4′ long), the upper floral ones shorter than the nearly sessile calyx; whorls 6 – 10-flowered, the upper crowded into an interrupted spike; calyx hispid; the lance-subulate teeth somewhat spiny, half the length of the corolla, diverging in fruit; *upper lip of corolla pubescent.* — Wet ground, Newf. to Penn., westward across the continent.

3. **S. áspera,** Michx. Taller; *stem more commonly smooth on the sides, the angles beset with stiff reflexed bristles;* leaves hairy or smoothish, as in the last, but *nearly all distinctly petioled,* the lower floral as long as the flowers; spike often slender and more interrupted; *calyx mostly glabrous,* the tube rather narrower and the teeth more awl-shaped and spiny; *corolla glabrous throughout.* (S. palustris, var. aspera, *Gray.*) — Wet ground, common.

Var. **glàbra,** Gray. More slender, *smooth and glabrous throughout,* or with few bristly hairs; leaves taper-pointed, more sharply toothed, mostly rounded or truncate at the base, *all more conspicuously petioled.* (S. palustris, var. glabra, *Gray.*) — Western N. Y. to Ill., and southward.

+- +- *Nearly all the leaves long-petioled and cordate.*

4. **S. cordàta,** Riddell. Rather weak, hirsute, 2 – 3° high; leaves all ovate- or oblong-cordate, acuminate, crenate (2 – 5′ long), the floral mostly minute; spikes slender, of numerous few-flowered clusters; calyx only 2″ long; corolla glabrous throughout (or nearly so), barely 5″ long. (S. palustris, var. cordata, *Gray.*) — Thickets, S. Ohio to Iowa, south to Va., Tenn., and Mo.

## ORDER 83. PLANTAGINÀCEÆ. (PLANTAIN FAMILY.)

*Chiefly stemless herbs, with regular 4-merous spiked flowers, the stamens inserted on the tube of the dry and membranaceous veinless monopetalous corolla, alternate with its lobes;* — chiefly represented by the two following genera.

### 1. PLANTÀGO, Tourn. PLANTAIN. RIBWORT.

Calyx of 4 imbricated persistent sepals, mostly with dry membranaceous margins. Corolla salver-form or rotate, withering on the pod, the border 4-parted. Stamens 4, or rarely 2, in all or some flowers with long and weak exserted filaments, and fugacious 2-celled anthers. Ovary 2- (or in n. 5 falsely 3–4-) celled, with 1–several ovules in each cell. Style and long hairy stigma single, filiform. Capsule 2-celled, 2–several-seeded, opening transversely, so that the top falls off like a lid and the loose partition (which bears the peltate seeds) falls away. Embryo straight, in fleshy albumen. — Leaves ribbed. Flowers whitish, small, in a bracted spike or head, raised on a naked scape. (The Latin name.)

§ 1. *Stamens 4; flowers all perfect; corolla not closed over the fruit.*

* *Flowers proterogynous, the style first projecting from the unopened corolla, the anthers long-exserted after the corolla has opened; seeds not hollowed on the face (except in* P. lanceolata).

+ *Corolla glabrous; leaves strongly ribbed; perennial.*

++ *Ribs of the broad leaves rising from the midrib.*

1. **P. cordàta,** Lam. Tall, glabrous; leaves heart-shaped or round-ovate (3–8′ long), long-petioled; spike at length loosely flowered; bracts round-ovate, fleshy; capsule 2–4-seeded. — Along streams, N. Y. to Minn., and southward.

++ ++ *Ribs of the leaf free to the contracted base.*

2. **P. màjor,** L. (Common Plantain.) Smooth or rather hairy, rarely roughish; *leaves ovate, oblong, oval,* or slightly heart-shaped, often toothed, abruptly narrowed into a channelled petiole; *spike dense, obtuse;* sepals round-ovate or obovate; *capsule ovoid, circumscissile near the middle, 8–18-seeded; seeds angled, reticulated.* — Waysides and near dwellings everywhere. Doubtless introduced from Eu., but native from L. Superior and N. Minn., northward.

3. **P. Rugélii,** Decaisne. Leaves as in the last, but paler and thinner; *spikes long and thin, attenuate at the apex;* sepals oblong, acutely carinate; *capsules cylindraceous-oblong, circumscissile much below the middle, 4–9-seeded; seeds oval-oblong, not reticulated.* (P. Kamtschatica, *Gray*, Man., not *Cham.*) — Vt. to Minn., south to Ga. and Tex.

4 **P. eriòpoda,** Torr. *Usually a mass of yellowish wool at the base; leaves thickish, oblanceolate to obovate,* with short stout petioles; spike dense or loose; *sepals and bract more or less scarious but not carinate; capsule ovoid, never over 4-seeded.* — Moist and saline soil; Red River valley, Minn., and westward; also on the Lower St. Lawrence.

**P. lanceolàta,** L. (Ribgrass. Ripplegrass. English Plantain.) Mostly hairy; scape grooved-angled, at length much longer than the *lanceolate or lance-oblong leaves,* slender (9′–2° high); spike dense, at first capitate, in age cylindrical; bract and sepals scarious, brownish; *seeds 2, hollowed on the face.* — Very common. (Nat. from Eu.)

+ + *Corolla-tube externally pubescent; leaves linear or filiform, fleshy, indistinctly ribbed; seeds 2–4; maritime, often woolly at base.*

5. **P. decípiens,** Barneoud. *Annual,* or sometimes biennial with a stout rootstock, smooth, or the scape pubescent; leaves flat or flattish and channelled, erect, nearly as long as the scape (5–12′), acuminate; spike slender, rather loose. (P. maritima, var. juncoides, *Gray*, Man.) — Salt marshes, Atlantic coast, from Labrador to N. J. The characters distinguishing biennial specimens of this from the next are obscure.

6. **P. marítima,** L. *Perennial;* spikes dense. — Coast of Mass.; Gulf of St. Lawrence to Lab. and Greenland. (Eu.)

* * *Flowers of 2 sorts (as respects length of anthers and filaments) on different plants, mostly cleistogamous; corolla-lobes broad, rounded, persistently spreading; seeds 2, boat-shaped; inflorescence and narrow leaves silky-pubescent or woolly; annual.*

7. **P. Patagónica,** Jacq., var. **gnaphalioìdes,** Gray. White with silky wool; leaves 1–3-nerved, varying from oblong-linear to filiform; spike very dense (½–4′ long), woolly; bracts not exceeding the calyx; sepals very obtuse, scarious, with a thick centre. — Prairies and dry plains, Minn. to Ind., Ky., and Tex., westward to the Pacific. Very variable. — Var. NÙDA, Gray; with sparse and loose pubescence, green and soon glabrate rigid leaves, and short bracts. — Var. SPINULÒSA, Gray; a canescent form with aristately prolonged and rigid bracts. — Var. ARISTÀTA, Gray; loosely hairy and green, or becoming glabrous, with narrowly linear bracts 2–3 times the length of the flowers. (Nat. on Martha's Vineyard, and about Boston.)

§ 2. *Flowers subdiœcious or polygamo-cleistogamous; the corolla in the fertile (or mainly fertile) plant closed over the maturing capsule and forming a kind of beak, and anthers not exserted; sterile flowers with spreading corolla and long-exserted filaments; seeds mostly flat; small annuals or biennial.*

* *Leaves comparatively broad, short-petioled or subsessile; stamens 4.*

8. **P. Virgínica,** L. Hairy or hoary-pubescent (2–9′ high); leaves oblong, varying to obovate and spatulate-lanceolate, 3–5 nerved, slightly or coarsely and sparingly toothed; spikes mostly dense (1–2′ long); seeds usually 2. — Sandy grounds, S. New Eng. to S. Ill., south to Fla. and Ariz.

* * *Leaves linear or filiform; flowers very small; stamens 2; spike slender.*

9. **P. pusílla,** Nutt. Minutely pubescent (1–4′ high); leaves entire; *capsule short-ovoid, 4-seeded,* little exceeding the calyx and bract. — Sandy soil, southern N. Y. to Va., west to the Rocky Mts. Apr.–Aug.

10. **P. heterophýlla,** Nutt. Leaves rather fleshy, acute, entire, or some of them below 2–4-lobed or toothed; *capsule oblong-conoidal, 10–28-seeded,* nearly twice the length of the calyx and bract. — Low sandy ground, Penn. to Fla. and Tex. Apr.–June.

## 2. LITTORÉLLA, L.

Flowers monœcious; the male solitary on a mostly simple naked scape; calyx 4-parted, longer than the cylindraceous 4-cleft corolla; stamens exserted on very long capillary filaments. Female flowers usually 2, sessile at the base of the scape; calyx of 3 or 4 unequal sepals; corolla urn-shaped, with a 3–4-toothed orifice. Ovary with a single cell and ovule, tipped with a long laterally stigmatic style, maturing as an achene. (Name from *litus* or *littus,* shore, from the place of growth.)

1. **L. lacústris,** L. Stoloniferous but otherwise stemless; leaves terete, linear-subulate, 1–2′ long. — In water or on gravelly shores, Nova Scotia and N. Brunswick, to L. Champlain (*Pringle*) and Ont.

## DIVISION III. APETALOUS DICOTYLEDONOUS PLANTS.

Corolla none; the floral envelopes in a single series (calyx), or sometimes wanting altogether.

### ORDER 84. NYCTAGINÀCEÆ. (FOUR-O'CLOCK FAMILY.)

*Herbs (or in the tropics often shrubs or trees), with mostly opposite and entire leaves, stems tumid at the joints, a delicate tubular or funnel-form calyx which is colored like a corolla, its persistent base constricted above the 1-celled 1-seeded ovary, and indurated into a sort of nut-like pericarp; the stamens few, slender, and hypogynous; the embryo coiled around the outside of mealy albumen, with broad foliaceous cotyledons* (in Abronia monocotyledonous by abortion). — Represented in our gardens by the FOUR-O'CLOCK, or MARVEL OF PERU (MIRÁBILIS JALÁPA), in which the calyx is commonly mistaken for a corolla, the cup-like involucre of each flower exactly imitating a calyx.

1. **Oxybaphus.** Involucre of united bracts. Fruit wingless. Calyx bell-shaped.
2. **Abronia.** Involucre of distinct bracts. Fruit 5-winged. Calyx salver-form.

### 1. OXÝBAPHUS, Vahl.

Flowers 3 – 5 in the same 5-lobed membranaceous broad and open involucre, which enlarges and is thin and reticulated in fruit. Calyx with a very short tube and a bell-shaped (rose or purple) deciduous limb, plaited in the bud. Stamens mostly 3 (3 – 5), hypogynous. Style filiform; stigma capitate. Fruit achene-like, several-ribbed or angled (pubescent in ours). — Herbs, abounding on the western plains, with very large and thick perennial roots, opposite leaves, and mostly clustered small flowers. (Name *ὀξυβάφον, a vinegar-saucer*, or small shallow vessel; from the shape of the involucre.)

1. **O. nyctagíneus,** Sweet. *Nearly smooth;* stem becoming repeatedly forked, 1 – 3° high; *leaves all petioled* (except the uppermost reduced ones), *from broadly ovate to lanceolate, rounded or cordate or cuneate at base;* inflorescence loose and but slightly pubescent, the peduncles slender (at first solitary in the axils); fruit oblong-obovate, 2″ long, rather acutely angled. — Minn. and Wisc. to Tex. and La.; rare escape from gardens in E. Mass. and R. I.

2. **O. hirsùtus,** Sweet. More or less *glandular-hirsute,* especially about the nodes and the usually contracted inflorescence, 1 – 3° high; *leaves lanceolate to linear-lanceolate, sessile* and cuneate at base or narrowed to a short petiole; stamens often 5; fruit with thickened obtuse angles. — Plains of the Sask. to Wisc., Iowa., Neb., and Tex.

3. **O. angustifòlius,** Sweet. Often tall, *glabrous* except the more or less hirsute peduncles and involucres; *leaves linear,* thick and glaucous, often elongated (2 – 6′ long); fruit as in the last. — Minn. to Tex., and westward.

### 2. ABRÒNIA, Juss.

Involucre of 5 – 15 distinct bracts, enclosing numerous sessile flowers. Calyx salver-form, with obcordate lobes. Stamens 5, included, adnate to the calyx-tube. Style included; stigma linear-clavate. Perfect fruit 3 – 5-winged.

Embryo monocotyledonous. — Low herbs, with thick opposite petioled unequal leaves, axillary or terminal peduncles, and showy flowers in solitary heads. (Name from ἁβρός, *graceful*.)

1. **A. frāgrans,** Nutt. More or less viscid-pubescent, from a perennial root; leaves oblong or ovate, truncate or cuneate at base; involucre conspicuous, of broad ovate white and scarious bracts; flowers white, fragrant, 4–10″ long; fruit coriaceous, obpyramidal, with narrow undulate coarsely reticulated wings. — From W. Iowa to Utah and N. Mex.

## ORDER 85. ILLECEBRÀCEÆ. (KNOTWORT FAMILY.)

*Herbs, with mostly opposite and entire leaves, scarious stipules* (except in Scleranthus), *a* 4–5-*toothed or -parted herbaceous or coriaceous persistent calyx*, no petals, *stamens borne on the calyx, as many as the lobes and opposite them or fewer, styles* 2 *and often united, and fruit a* 1-*seeded utricle.* Seed upon a basal funicle, the embryo (in ours) surrounding the mealy albumen. — Small diffuse or tufted herbs, with small greenish or whitish flowers in clusters or dichotomous cymes.

1. **Anychia.** Stamens on the base of the 5-parted awnless calyx. Styles hardly any.
2. **Paronychia.** Stamens on the base of the 5-parted calyx; the sepals hooded at the summit and bristle-pointed. Style 1, 2-cleft at the top.
3. **Scleranthus.** Stamens borne on the throat of the indurated 5-cleft and pointless calyx. Styles 2. Stipules none.

### 1. ANÝCHIA, Michx. FORKED CHICKWEED.

Sepals 5, scarcely concave, indistinctly mucronate on the back, greenish. Stamens 2–3, rarely 5. Stigmas 2, sessile. Utricle larger than the calyx. Radicle turned downward. — Small, many times forked annuals, with small stipules, and minute flowers in the forks, produced all summer. (Same derivation as the next genus.)

1. **A. dichótoma,** Michx. *More or less pubescent, short-jointed, low and spreading;* leaves somewhat petioled, mostly very narrowly lanceolate or oblanceolate; *flowers nearly sessile* and somewhat clustered. — Mostly in open places, N. Eng. to Fla., west to Minn. and Ark.

2. **A. capillàcea,** DC. *Smooth, longer-jointed, slender and erect; leaves thinner, broader and longer* (5–15″ long); *flowers more stalked and diffuse.* (A. dichotoma, var. capillacea, *Torr.*) — Dry woodlands, same range as the last, but more abundant northward.

### 2. PARONÝCHIA, Tourn. WHITLOW-WORT.

Sepals 5, linear or oblong, concave, awned at the apex. Petals (or staminodia) bristle-form, or minute teeth, or none. Stamens 5. Style 2-cleft at the apex. Utricle enclosed in the calyx. Radicle ascending. — Tufted herbs (ours perennial), with dry and silvery stipules, and clustered flowers. (Greek name for a *whitlow*, and for a plant thought to cure it.)

1. **P. argyrócoma,** Nutt. Forming broad tufts, branched, *spreading; leaves linear* (½′ long); *flowers densely clustered*, surrounded by conspicuous *large silvery bracts;* calyx hairy, short-awned; petals mere teeth between the

stamens. — Bare mountain slopes of the White Mts., and in the Alleghanies from Va. to Ga.; also coast of Maine and near Newburyport, Mass. July.

2. **P. dichótoma,** Nutt. Smooth, tufted; stems (6 – 12′ high) *ascending* from a rather woody base; *leaves* (½ – 1½′ long) *and bracts* narrowly *awl-shaped; cymes open, many-times forked;* sepals short-pointed; minute bristles in place of petals. — Rocks, Md. to N. C. and Tex. July – Sept.

3. **P. Jamèsii,** Torr. & Gray. Subcespitose, much branched from the somewhat woody base, minutely puberulent; leaves filiform subulate, obtuse or mucronate; forked cymes rather close; calyx narrow-campanulate with turbinate base. — Central Kan. to W. Neb., Col., and Tex.

### 3. SCLERÁNTHUS, L. Knawel.

Sepals 5, united below in an indurated cup, enclosing the utricle. Stamens 10 or 5. Styles 2, distinct. — Homely little weeds, with awl shaped leaves, obscure greenish clustered flowers, and no stipules. (Name from σκληρός, *hard,* and ἄνθος, *flower*, from the hardened calyx-tube.)

**S.** Ánnuus, L. Much branched, spreading (3 – 5′ high); flowers sessile in the forks; calyx-lobes scarcely margined. — Waste places. (Nat. from Eu.)

## Order 86. AMARANTÀCEÆ. (Amaranth Family.)

*Weedy herbs, with nearly the characters of the next family, but the flowers mostly imbricated with dry and scarious persistent bracts; these often colored, commonly* 3 *in number;* the 1-celled ovary in our genera 1-ovuled. (The greater part of the order tropical.)

* Anthers 2-celled; flowers unisexual; leaves alternate.

1. **Amarantus.** Flowers monœcious or polygamous, all with a calyx of 3 or 5 distinct erect sepals, not falling off with the fruit.
2. **Acnida.** Flowers diœcious. Calyx none in the fertile flowers.

* * Anthers 1-celled; flowers perfect; leaves opposite.

3. **Iresine.** Calyx of 5 sepals. Filaments united below into a cup. Flowers paniculate.
4. **Frœlichia.** Calyx 5-cleft. Filaments united into a tube. Flowers spicate.

### 1. AMARÁNTUS, Tourn. Amaranth.

Flowers monœcious or polygamous, 3-bracted. Calyx of 5, or sometimes 3, equal erect sepals, glabrous. Stamens 5, rarely 2 or 3, separate; anthers 2-celled. Stigmas 2 or 3. Fruit an ovoid 1-seeded utricle, 2 – 3-beaked at the apex, mostly longer than the calyx, opening transversely or sometimes bursting irregularly. Embryo coiled into a ring around the albumen. — Annual weeds, of coarse aspect, with alternate and entire petioled setosely tipped leaves, and small green or purplish flowers in axillary or terminal spiked clusters; in late summer and autumn. (Ἀμάραντος, *unfading*, because the dry calyx and bracts do not wither. The Romans, like the Greeks, wrote Amarantus, which the early botanists incorrectly altered to *Amaranthus*.)

§ 1. *Utricle thin, circumscissile, the top falling away as a lid; flowers polygamous.*

* *Flowers in terminal and axillary simple or mostly panicled spikes; stem erect* (1 – 6° *high*); *leaves long-petioled; stamens and sepals* 5.

+ Red Amaranths. *Flowers and often leaves tinged with crimson or purple.*

**A.** hypochondrìacus, L. Glabrous; leaves oblong-lanceolate, acute or pointed at both ends; *spikes very obtuse*, thick, crowded, the terminal one elongated and interrupted; *bracts long-awned; fruit 2–3-cleft at the apex*, longer than the calyx. — Rarely spontaneous about gardens. (Adv. from Trop. Amer.)

**A. paniculàtus**, L. Stem mostly pubescent; leaves oblong-ovate or ovate-lanceolate; *spikes numerous and slender, panicled*, erect or spreading; *bracts awn-pointed;* flowers small, green tinged with red, or sometimes crimson; *fruit* 2–3-*toothed* at the apex, longer than the calyx. — Roadsides, etc. (Adv. from Trop. Amer.)

+ + GREEN AMARANTHS, PIGWEED. *Flowers green, rarely a little reddish.*

**A. retrofléxus**, L. Roughish and more or less pubescent; leaves dull green, long-petioled, ovate or rhombic-ovate, undulate; the thick spikes crowded in a stiff or glomerate panicle; bracts awn-pointed, rigid, exceeding the acute or obtuse sepals. — Cultivated grounds, common; indigenous southwestward. (Adv. from Trop. Amer.)

**A. chloróstachys**, Willd. Very similar, but smoother and deeper green, with more slender, linear-cylindric, more or less flexuous spikes, the lateral ones spreading or divaricate, and the sepals more frequently acute or acuminate. (A. retroflexus, var. chlorostachys, *Gray*.) — Cultivated grounds; apparently also indigenous southwestward. — Var. HÝBRIDUS, Watson, is similar, but smooth and still more loosely panicled. (A. retroflexus, var. hybridus, *Gray*.) (Adv. from Trop. Amer.)

* * *Flowers crowded in close and small axillary clusters; stems low, spreading or ascending; stamens and sepals* 3, *or the former only* 2.

1. **A. álbus**, L. (TUMBLE WEED.) Smooth, pale green; *stems whitish, erect or ascending*, diffusely branched; leaves small, obovate and spatulate-oblong, very obtuse or retuse; flowers greenish; sepals acuminate, half the length of the *rugose fruit*, much shorter than the *subulate rigid pungently pointed bracts; seed small*, ⅓″ *broad*. — Waste grounds, common.

2. **A. blitoìdes**, Watson. Like the last, but *prostrate or decumbent;* spikelets usually contracted; *bracts ovate-oblong, shortly acuminate;* sepals obtuse or acute; *fruit not rugose; seed about* 1″ *broad*. — From Minn. to Mo. and Tex., and westward, and introduced eastward as far as western N. Y.

**A. Blìtum**, L., resembles the last, but is usually erect, with shorter and more scarious bracts, and a smaller seed more notched at the hilum. — Near N. Y. City and Boston. (Adv. from Eu.)

§ 2. *Utricle thinnish, bursting or imperfectly circumscissile; flowers monœcious.*

**A. spinòsus**, L. (THORNY AMARANTH.) Smooth, bushy-branched; stem reddish; leaves rhombic-ovate or ovate-lanceolate, dull green, a pair of *spines in their axils;* upper clusters sterile, forming long and slender spikes; the fertile globular and mostly in the axils; flowers yellowish-green, small. — Waste grounds, N. Y. to E. Kan., and southward. (Nat. from Trop. Amer.)

§ 3. EÙXOLUS. *Utricle rather fleshy, remaining closed or bursting irregularly; no spines; bracts inconspicuous.*

3. **A. pùmilus**, Raf. Low or prostrate; leaves fleshy and obovate, emarginate, strongly nerved; flower-clusters small and axillary; *stamens and sepals* 5, the latter half the length of the obscurely 5-ribbed fruit. — Sandy beaches, R. I. to Va.

**A. críspus**, Braun. Very slender, procumbent, pubescent; leaves small, light green, rhombic-ovate to -lanceolate, acute, the margin crisped and undulate; flowers in small axillary clusters; bracts and sepals scarious, oblanceolate, acute or obtuse; utricle about as long, roughened, not nerved nor angled. (A. viridis, *Man.*) — Streets of Albany, New York City and Brooklyn; doubtless introduced, but the native habitat unknown.

## 2. ACNÌDA, Mitch. WATER-HEMP.

Characters of Amarantus, except that the flowers are completely diœcious and the pistillate ones without calyx. Bracts 1 – 3, unequal. Staminate calyx of 5 thin oblong mucronate-tipped sepals, longer than the bracts; stamens 5, the anther-cells united only at the middle. Stigmas 2 – 5, often long and plumose-hispid. Fruit somewhat coriaceous and indehiscent, or a thin membranous utricle dehiscing irregularly (rarely circumscissile), usually 3 – 5-angled. (Name from *α*- privative, and *κνίδη, a nettle.*)

§ 1. ACNIDA proper. *Fruit indehiscent, with firm and close pericarp.*

1. **A. cannábina,** L. Usually stout, 2 – 6° high or more, glabrous; leaves lanceolate to linear-lanceolate, acuminate, long-petioled; sepals of sterile flowers ovate-oblong, obtuse or acutish; bracts usually thin and lax, much shorter than the fruit, sometimes more rigid and longer; fruit about 1″ long, obovate, the pericarp rather thin, more or less rugosely angled; seed somewhat turgid, not angled, usually less than 1″ long, shining. — Salt or brackish marshes, coast of N. Eng. to Fla.

2. **A. rusocárpa,** Michx. Very similar; fruit larger, 1½ – 2″ long, the pericarp thicker, and the larger seed flattened with thick margins, usually thickest on the cotyledonar side. — N. Y. (?) and Penn. to S. Car.; apparently much less common than the last, though it is often difficult to positively distinguish the species from the immature fruit.

§ 2. MONTÈLIA. *Fruit dehiscing irregularly, the pericarp thin, loose and usually roughened; not salt-marsh plants.*

3. **A. tuberculàta,** Moq. Tall and erect, or sometimes low and decumbent; leaves lanceolate, acute or acutish or sometimes obtuse; sepals of sterile flowers lanceolate, acute or acuminate; pistillate flowers closely clustered in more or less dense naked or leafy axillary and terminal spikes (or the axillary capitate); bracts rather rigid, acuminate, equalling or exceeding the fruit: utricle about ½″ long; seed shining, ½ – ⅓″ in diameter. (Montelia tamariscina, *Gray*, in part.) — Ohio to Dak., Mo., Ala., and La.

Var. **subnùda,** Watson. Erect or often prostrate, the lower clusters at least of pistillate flowers more or less cymose and often in globose heads; bracts thinner, narrow and lax, shorter than the fruit. (M. tamariscina, var. concatenata, *Gray*, in part.) — W. Vt. (*Oakes*); Ont. to Minn., and southward. Often appearing quite distinct from the type, but intermediate forms are not rare.

## 3. IRESÌNE, P. Browne.

Flowers mostly polygamous or diœcious, 3-bracted. Calyx of 5 sepals. Stamens mostly 5; filaments slender, united into a short cup at base; anthers 1-celled, ovate. Fruit a globular utricle, not opening. — Herbs, with opposite petioled leaves, and minute scarious-white flowers, crowded into clusters or spiked and branching panicles; the calyx, etc., often bearing long wool (whence the name, from *εἰρεσιώνη*, a wreath or staff entwined with fillets of wool).

1. **I. celosioìdes,** L. Nearly glabrous, annual, erect, slender (2 – 4° high); leaves ovate-lanceolate; panicles very slender, often broad and diffuse, naked; bracts and calyx silvery-white, the fertile calyx twice longer than the

broad bracts and densely silky-villous at base. — Dry banks, Ohio to Kan., and far southward. Sept.

### 4. FRŒLÍCHIA, Moench.

Flowers perfect, 3-bracted. Calyx tubular, 5-cleft at the summit, below 2 – 5-crested lengthwise, or tubercled and indurated in fruit, enclosing the indehiscent thin utricle. Filaments united into a tube, bearing 5 oblong 1-celled anthers, and as many sterile strap-shaped appendages. — Hairy or woolly herbs, with opposite sessile leaves, and spiked scarious-bracted flowers. (Named for *J. A. Froelich*, a German botanist of the last century.)

1. **F. Floridàna,** Moquin. Root annual; stem leafless above (1 – 3° high); leaves lanceolate, silky-downy beneath; spikelets crowded into an interrupted spike; calyx very woolly, becoming broadly winged, the wings irregularly toothed. — Dry sandy places, S. Minn. to Ill., Col., Tex., and Fla.

2. **F. grácilis,** Moq. More slender, with narrow leaves, the spikelets smaller, and the crests of the matured calyx of nearly distinct rigid processes. — Col. to Tex., and is reported from Kansas.

## ORDER 87. CHENOPODIÀCEÆ. (GOOSEFOOT FAMILY.)

*Chiefly herbs, of homely aspect, more or less succulent, with mostly alternate leaves and no stipules nor scarious bracts, minute greenish flowers, with the free calyx imbricated in the bud; the stamens as many as its lobes, or occasionally fewer, and inserted opposite them or on their base; the* 1*-celled ovary becoming a* 1*-seeded thin utricle or rarely an achene. Embryo coiled into a ring around the mealy albumen, when there is any, or else conduplicate, or spiral.* — Calyx persistent, mostly enclosing the fruit. Styles or stigmas 2, rarely 3 – 5. (Mostly inert or innocent, weedy plants; several are pot-herbs, such as Spinach and Beet.)

* Embryo coiled into a ring about usually copious central albumen. Leaves flat, not spiny. Stem not jointed.

+ Flowers perfect (or stamens only occasionally wanting), clustered or panicled; calyx obvious, persistent. Seed-coat crustaceous.

1. **Cycloloma.** Calyx 5-cleft, in fruit surrounded by a horizontal continuous membranaceous wing. Seed horizontal, crustaceous. Leaves sinuate-toothed.
2. **Kochia.** Like n. 1, but wing 5-lobed and seed-coat membranaceous. Leaves entire.
3. **Chenopodium.** Calyx 3 – 5-parted, unchanged or becoming fleshy in fruit.
4. **Roubieva.** Calyx 3 – 5-toothed, becoming saccate. Leaves pinnatifid.

+ + Flowers monœcious or diœcious; the staminate in clusters, mostly spiked: the pistillate without calyx, enclosed between a pair of appressed axillary bracts

5. **Atriplex.** Fruiting bracts with margins often dilated and sides often muricate

+ + + Flowers perfect, naked or 1-sepaled, solitary in the axils of the reduced upper leaves.

6. **Corispermum.** Pericarp oval, flattened, adherent to the vertical seed. Leaves linear.

* * Embryo narrowly horseshoe-shaped or conduplicate no albumen. Stem fleshy, jointed; leaves reduced to opposite fleshy scales or teeth. Flowers densely spiked, perfect.

7. **Salicornia.** Flowers sunk in hollows of the axis of the fleshy spike. Calyx utricle-like.

* * * Embryo coiled into a spiral; albumen mostly none. Leaves fleshy, alternate.

8. **Suæda.** Embryo flat-spiral. Calyx wingless. Leaves succulent.
9. **Salsola.** Embryo conical-spiral. Calyx in fruit horizontally winged. Leaves spinescent.

## 1. CYCLOLÒMA, Moquin. WINGED PIGWEED.

Flowers perfect or pistillate, bractless. Calyx 5-cleft, with the concave lobes strongly keeled, enclosing the depressed fruit, at length appendaged with a broad and continuous horizontal scarious wing. Stamens 5. Styles 3 (rarely 2). Seed horizontal, flat; coats crustaceous. Embryo encircling the mealy albumen. — An annual and much-branched coarse herb, with alternate sinuate-toothed petioled leaves, and very small scattered sessile flowers in open panicles. (Name composed of *κύκλος*, *a circle*, and *λῶμα*, *a border*, from the encircling wing of the calyx.)

1. **C. platyphýllum**, Moquin. — Diffuse (6 – 15′ high), more or less arachnoid-pubescent or glabrate, light green or often deep purple. — Sandy soil, Minn. to W. Ill., S. Ind., Ark., and westward across the plains.

## 2. KÒCHIA, Roth.

Characters nearly as in Cycloloma, but the seed-coat membranaceous and the albumen wanting. — Annuals or suffruticose perennials, with flat or more usually linear and terete leaves. (Named for *W. D. J. Koch*, a German botanist.)

K. SCOPÀRIA, Schrad. Annual, erect, puberulent or glabrate, branching; leaves narrowly lanceolate to linear; flowers in small axillary clusters, sessile, each sepal developing a thick wing. — Sparingly introduced; Vt., Ont., and Ill. (Nat. from Eu.)

## 3. CHENOPÒDIUM, Tourn. GOOSEFOOT. PIGWEED.

Flowers perfect, all bractless. Calyx 5- (rarely 4-) parted or lobed, unchanged in fruit or becoming succulent and berry-like, more or less enveloping the depressed fruit. Stamens mostly 5; filaments filiform. Styles 2, rarely 3. Seed horizontal or vertical, lenticular; the coat crustaceous; embryo coiled partly or fully round the mealy albumen. — Weeds, usually with a white mealiness, or glandular. Flowers sessile in small clusters collected in spiked panicles. (Named from *χήν*, *a goose*, and *πούς*, *foot*, in allusion to the shape of the leaves.) — Our species are mostly annuals, flowering through late summer and autumn, growing around dwellings, in manured soil, cultivated grounds, and waste places.

§ 1. *Annual, more or less mealy, not glandular nor aromatic; fruiting calyx dry; seed horizontal; embryo a complete ring.*

* *Pericarp very easily separated from the seed; leaves entire or rarely sinuate-dentate.*

1. **C. Bosciànum**, Moq. Erect, slender (2° high), loosely branched, often *nearly glabrous; leaves oblong- to linear-lanceolate* (1 – 2′ long), attenuate into a *slender petiole*, acute, the lower sinuate-dentate or often all entire; flowers small, solitary or in small clusters upon the slender branchlets; *calyx not strongly carinate.* (C. album, var. Boscianum, *Gray*, Manual.) — N. Y. to Minn., south to N. C. and Tex.

2. **C. leptophýllum**, Nutt. *Densely mealy* or rarely nearly glabrous (½ – 1½° high), simple or branched, often strict; *leaves linear* (½ – 1′ long), entire, *rather shortly petioled;* flowers closely clustered, in dense or interrupted spikelets; *calyx-lobes strongly carinate.* — Sea-coast, Conn. to N. J., north shore of L. Erie, and from Dak. to Col., N. Mex., and westward.

* * *Pericarp persistent upon the smooth seed ; leaves more or less sinuate-dentate (except in* C. polyspermum).

C. polyspérmum, L. Low, often spreading, green and *wholly destitute of mealiness ; leaves all entire,* oblong or ovate and on slender petioles; flowers very small, in slender panicles in all the axils, the thin lobes of the calyx very incompletely enclosing the fruit; seed obtuse-edged. — Sparingly naturalized in the Eastern States. (Adv. from Eu.)

C. álbum, L. (Lamb's-Quarters. Pigweed.) Erect (1 – 4° high), *more or less mealy ; leaves varying from rhombic-ovate to lanceolate* or the uppermost even linear, acute, *all or only the lower more or less angulate-toothed ;* clusters spiked-panicled, mostly dense; calyx ($\frac{3}{4}''$ wide in fruit) with strongly carinate lobes, nearly or quite covering the seed. — Introduced everywhere. (Nat. from Eu.) — Var. víride, Moq., more common eastward, is less mealy and with less dense inflorescence.

C. úrbicum, L. Rather pale or dull green, nearly destitute of mealiness, with erect branches (1 – 3° high); *leaves* triangular, acute, *coarsely and sharply many-toothed ; spikes erect, crowded in a long and narrow racemose panicle ;* calyx-lobes not keeled; *seed with rounded margins.* — Apparently throughout our range. (Nat. from Eu.)

C. murále, L. Resembles the preceding, but less erect, loosely branched (1 – 2° high); *leaves rhomboid-ovate,* acute, *coarsely and sharply unequally toothed,* thin, bright green; *spikes or racemes diverging, somewhat corymbed ;* calyx-lobes scarcely keeled; *seed sharp-edged.* — From N. Eng. to Mich. and Mo. (Adv. from Eu.)

3. **C. hýbridum,** L. (Maple-leaved Goosefoot.) Bright green throughout; stem widely much branched (2 – 4° high); *leaves thin* (2 – 6′ long), somewhat triangular and heart-shaped, taper-pointed, *sinuate-angled,* the angles extending into a *few large and pointed teeth ;* racemes diffusely and loosely panicled, leafless; calyx not fully covering the fruit, its lobes keeled. — Indigenous from western N. Y. and Ky., westward across the continent; introduced eastward.

§ 2. *Annual or perennial herbs, somewhat mealy, not glandular-pubescent : fruiting calyx dry ; seed large, subglobose, vertical, exserted ; embryo a complete ring.*

C. glaùcum, L. (Oak-leaved Goosefoot.) *Low* (5 – 12′ high), *spreading, glaucous-mealy ; leaves sinuately pinnatifid-toothed,* oblong, obtuse, pale green above; *clusters in axillary spikes,* small; *seed sharp-edged.* — Throughout our range and westward. (Nat. from Eu.)

C. Bonus-Henrìcus, L. (Good-King-Henry.) *Stout, erect* (1 – 2° high), mostly simple; *leaves broadly triangular-hastate* (2 – 3′ long), obtuse or acute, *subsinuate or entire ; flowers somewhat densely paniculately spiked ; seed with obtuse edges.* (Blitum Bonus-Henricus, *Reichenb.*) — Sparingly introduced. (Adv. from Eu.)

§ 3. *Annual, glabrous ; calyx more or less fleshy in fruit and often colored, enclosing the utricle ; seed mostly vertical ; embryo a complete ring ; flowers in crowded clusters, axillary or in spikes.*

4. **C. rùbrum,** L. (Coast Blite.) Stem angled, much branched; leaves thickish, triangular-lanceolate, tapering below into a wedge-shaped base and above into a slender point, sparingly and coarsely toothed, the upper linear-lanceolate; *clusters scattered in axillary leafy spikes ; calyx-lobes* 2 – 4, *rather fleshy ;* stamens 1 – 2; seed shining, the margin acute. (Blitum maritimum, *Nutt.*) — Sea-coast of Northern States, and in saline places to Minn. (Eu.)

5. **C. capitàtum,** Watson. (Strawberry Blite.) Stem ascending, branching; leaves triangular and somewhat halberd-shaped, sinuate-toothed;

*clusters simple* (*large*), *interruptedly spiked*, the upper leafless; stamens 1–5; *calyx berry-like* in fruit; seed ovoid, flattish, smooth, with a very narrow margin. (Blitum capitatum, *L.*) — Dry rich ground, along the Great Lakes, northward and westward. The calyx becomes pulpy and bright red in fruit, when the large clusters look like strawberries. (Eu.)

§ 4. *Annual, not mealy, but more or less glandular-pubescent, aromatic; calyx 2–3-parted, dry in fruit; seed often vertical; embryo not a complete ring.*

**C.** Bòtrys, L. (Jerusalem Oak. Feather Geranium.) Glandular-pubescent and viscid; *leaves slender-petioled*, oblong, obtuse, sinuate-pinnatifid; *racemes cymose-diverging, loose, leafless;* fruit not perfectly enclosed. — Widely introduced. (Nat. from Eu.)

**C.** ambrosioìdes, L. (Mexican Tea.) Smoothish; *leaves slightly petioled*, oblong or lanceolate, repand-toothed or nearly entire, the upper tapering to both ends; *spikes densely flowered, leafy*, or intermixed with leaves; fruit perfectly enclosed in the calyx. — Waste places, common throughout our range, especially southward. (Nat. from Trop. Amer.)

Var. anthelmínticum, Gray. (Wormseed.) Leaves more strongly toothed, the lower sometimes almost laciniate-pinnatifid; *spikes more elongated, mostly leafless.* — From Long Island and southward, west to Wisc. and Tex. (Nat. from Trop. Amer.)

## 4. ROUBIÈVA, Moquin.

Flowers minute, perfect or pistillate, solitary or 2–3 together in the axils. Calyx urceolate, 3–5-toothed, becoming enlarged and saccate, contracted at the apex and enclosing the fruit. Stamens 5, included; styles 3, exserted. Fruit membranaceous, compressed, glandular-dotted. Seed vertical. Embryo annular. — Perennial glandular herb, with alternate pinnatifid leaves.

**R.** multífida, Moq. Prostrate or ascending, branching and leafy; leaves lanceolate to linear (½–1½′ long), deeply pinnatifid with narrow lobes; fruiting calyx obovate. (Chenopodium multifidum, *L.*) — Sparingly introduced in the Atlantic States. (Adv. from S. Amer.)

## 5. ÁTRIPLEX, Tourn. Orache.

Flowers monœcious or diœcious; the staminate like the flowers of Chenopodium, but sterile by the abortion of the pistil; the fertile consisting simply of a naked pistil enclosed between a pair of appressed foliaceous bracts, which are enlarged in fruit, and sometimes united. Seed vertical. Embryo coiled into a ring around the albumen. In one section, including the Garden Orache, there are some fertile flowers with a calyx, like the staminate, but without stamens, and with horizontal seeds. — Herbs (ours annuals) usually mealy or scurfy with bran-like scales, with spiked-clustered flowers; in summer and autumn. (The ancient Latin name, a corruption of the Greek, ἀτράφαξις.)

**A.** ròseum, L. Hoary-mealy; leaves short-petioled or the upper sessile, rhombic-ovate or oblong with a wedge-shaped base, coarsely sinuate-toothed; fertile flowers mostly clustered in the axils; fruiting bracts broad, often cut-toothed and warty. — Sparingly introduced at the east. (Adv. from Eu.)

1. **A. pátulum,** L. Erect or prostrate (1–4° high), dark green and glabrous or somewhat scurfy; leaves narrowly lanceolate-hastate (1–4′ long), the lower sometimes opposite, entire or sparingly sinuate-dentate, petioled, the upper lanceolate to linear; flowers clustered in rather slender spikes, the two kinds together or separate; fruiting bracts ovate-triangular or rhombic-hastate, entire or toothed, often muricate on the back, united to near the

middle. — Very variable. The typical form scarcely occurs except as naturalized from Europe. — Var. HASTÀTUM, Gray. Erect or spreading, stout, at least the lower leaves broadly triangular-hastate, often coarsely and irregularly toothed. Salt and brackish places, on the coast from Can. to Va., along the Great Lakes, and far westward. — Var. LITTORÀLE, Gray. Slender; leaves linear-lanceolate to linear, rarely subhastate or toothed. Canada to N. J., and westward along the Great Lakes. — Var. SUBSPICÀTUM, Watson. A low erect and often simple form (3 – 12′ high), usually quite scurfy; leaves lanceolate-hastate (½ – 1′ long). Minn. to central Kan., and westward.

2. **A. arenàrium**, Nutt. *Silvery-mealy*, diffusely spreading; leaves oblong, narrowed at base, nearly sessile; fruiting bracts broadly wedge-shaped, united, 3-nerved, 2 – 5-toothed at the summit, and usually strongly muricate and reticulate on the sides. — Sandy beaches, along the coast, Mass. to Fla.

3. **A. argénteum**, Nutt. Usually low, much branched, gray-scurfy, leafy; leaves deltoid or subrhombic, often subhastate; staminate flowers in terminal spikes; fruiting bracts round-rhombic, indurated, united, the free margins more or less dilated and deeply toothed, the sides variously appendaged. — Red River Valley, Minn., south and westward.

### 6. CORISPÉRMUM, A. Juss. BUG-SEED.

Flowers perfect, single and sessile in the axils of the upper leaves reduced to bracts, usually forming a spike. Calyx of a single delicate sepal on the inner side. Stamens 1 or 2, rarely 5. Styles 2. Fruit oval, flat, with the outer face rather convex and the inner concave, sharp-margined, a *caryopsis*, i. e. the thin pericarp adherent to the vertical seed. Embryo slender, coiled around a central albumen. — Low branching annuals, with narrow linear alternate 1-nerved leaves. (Name formed of *κόρις*, *a bug*, and *σπέρμα*, *seed*.)

1. **C. hyssopifòlium**, L. Somewhat hairy when young, pale; floral leaves or bracts awl-shaped from a dilated base or the upper ovate and pointed, scarious-margined; fruit wing-margined. — Sandy beaches along the Great Lakes, central Neb., Tex., and westward. — Leaves usually pungent.

### 7. SALICÓRNIA, Tourn. GLASSWORT. SAMPHIRE.

Flowers perfect, 3 together immersed in each hollow of the thickened upper joints, forming a spike; the two lateral sometimes sterile. Calyx small and bladder-like, with a toothed or torn margin, at length spongy and narrowly wing-bordered, enclosing the flattened thin utricle. Stamens 1 or 2. Styles 2, united at base. Seed vertical, without albumen. Embryo thick, the cotyledons incumbent upon the radicle. — Low saline plants, with succulent leafless jointed stems, and opposite branches; the flower-bearing branchlets forming the spikes. (Name composed of *sal*, salt, and *cornu*, a horn; saline plants with horn-like branches.)

1. **S. mucronàta**, Bigel. Annual, erect, stout, naked below (2 – 12′ high), *turning red* in age; *spikes thick, closely jointed; scales mucronate-pointed and conspicuous*, especially when dry; *middle flower half higher than the lateral ones* or less, occupying nearly the whole length of the joint; fruit pubescent; seed ½ – ⅔″ long. (S. Virginica, *Gray*, Manual; not *L.*) — Sea-coast from N. Scotia to Va.

2. **S. herbàcea,** L. Annual, erect or at length spreading (6 – 18′ high), *green; scales obscure and very blunt*, making a truncate barely emarginate termination of *the longer joints* of the stem or *elongated narrower spikes;* middle flower much higher than the lateral ones, slightly shorter than the joint; fruit pubescent; seed ⅔ – 1″ long. — Salt marshes of the coast and interior salt springs, and alkaline localities.

3. **S. ambígua,** Michx. Numerous tufted stems (3 – 12′ long) decumbent or ascending from a hard and rather *woody creeping base or rootstock*, greenish, turning lead-colored; *spikes slender, short-jointed, the scales short, acutish or acute: flowers nearly equal in height* and equalling the joint; seed pubescent, ½″ long. (S. fruticosa, var. ambigua, *Gray*, Manual.) — Sea-coast, Mass. to Fla. and Tex.

### 8. SUǼDA, Forskal. Sea Blite.

Flowers perfect, sessile in the axils of leafy bracts. Calyx 5-parted, fleshy, enclosing the fruit (utricle) and often carinate or crested. Stamens 5. Stigmas 2 or 3. Seed vertical or horizontal, with a flat-spiral embryo, dividing the scanty albumen (when there is any) into two portions. — Fleshy saline plants, with alternate nearly terete linear leaves. (An Arabic name.)

1. **S. lineàris,** Moq. Annual, prostrate or usually erect, 1 – 2° high, branched; *leaves narrow at base*, ½ – 2′ long, acute; floral bracts acuminate, on slender branchlets; sepals very thick; anthers exserted; seed horizontal, round-oval, black, ½″ broad. (S. maritima, *Gray;* not *Dumort.*) — Sea-coast, N. Scotia to Fla. — A doubtful form of E. Mass. has the bracts and shorter leaves obtuse, larger flowers on less slender branchlets, and reddish seeds nearly 1″ broad.

2. **S. depréssa,** Watson. *Annual, decumbent* or erect, branching from the base; *leaves broadest at base*, the cauline 3 – 12″ long, the floral lanceolate to ovate; one or more of the calyx-lobes *very strongly carinate or crested.* — Saline soil, Red River Valley, Minn., to Col., and westward.

### 9. SÁLSOLA, L. Saltwort.

Flowers perfect, with 2 bractlets. Calyx 5-parted, persistent and enclosing the depressed fruit in its base; its divisions at length horizontally winged on the back, the wings forming a broad and circular scarious border. Stamens mostly 5. Styles 2. Seed horizontal, without albumen, filled by the embryo, which is coiled in a conical spiral (cochleate). — Herbs or slightly shrubby branching plants of the sea-shore, with fleshy and rather terete or awl-shaped leaves, and sessile axillary flowers. (Diminutive of *salsus*, salty.)

1. **S. Kàli,** L. (Common Saltwort.) Annual, diffusely branching, bushy, rough or smoothish; leaves all alternate, awl-shaped, pricky-pointed; flowers single; calyx with the converging lobes forming a sort of beak over the fruit, the large rose or flesh-colored wings nearly orbicular and spreading. — Sandy sea-shore, N. Eng. to Ga. Aug. (Eu.)

## Order 88. PHYTOLACCÀCEÆ. (Pokeweed Family.)

*Plants with alternate entire leaves and perfect flowers, having the general characters of* Chenopodiaceæ, *but usually a several-celled ovary composed of as many carpels united in a ring, and forming a berry in fruit.*

### 1. PHYTOLÁCCA, Tourn. Pokeweed.

Calyx of 5 rounded and petal-like sepals. Stamens 5 – 30. Ovary of 5 – 12 carpels, united in a ring, with as many short separate styles, in fruit forming a depressed-globose 5 – 12-celled berry, with a single vertical seed in each cell. Embryo curved in a ring around the albumen. — Tall and stout perennial herbs, with large petioled leaves, and terminal racemes which become lateral and opposite the leaves. (Name compounded of *φυτόν, plant*, and the French *lac*, lake, in allusion to the crimson coloring matter which the berries yield.)

1. **P. decándra**, L. (Common Poke or Scoke. Garget. Pigeon-Berry.) Stamens and styles 10. — Low grounds. July – Sept. — A smooth plant, with a rather unpleasant odor, and a very large poisonous root, often 4 – 6′ in diameter, sending up stout stalks at length 6 – 9° high; calyx white; ovary green; berries in long racemes, dark-purple and filled with crimson juice, ripe in autumn.

## Order 89. POLYGONACEÆ. (Buckwheat Family.)

*Herbs, with alternate entire leaves, and stipules in the form of sheaths* (ocreæ, these sometimes obsolete) *above the swollen joints of the stem; the flowers mostly perfect, with a more or less persistent calyx, a* 1*-celled ovary bearing* 2 *or* 3 *styles or stigmas, and a single erect orthotropous seed.* Fruit usually an achene, compressed or 3 – 4-angled or -winged. Embryo curved or straightish, on the outside of the albumen, or rarely in its centre. Stamens 4 – 12, inserted on the base of the 3 – 6-cleft calyx. (Juice often acrid, sometimes agreeably acid, as in Sorrel; the roots, as in Rhubarb, sometimes cathartic.)

* Flowers involucrate; stamens 9; stipules none.

1. **Eriogonum.** Involucre several-flowered, with flowers exserted. Calyx 6-cleft.

* * Flowers without involucre; stamens 4 to 8.

+ Stipular sheaths manifest; ovule erect from the base of the cell.

++ Sepals 4 or 6, the outer row reflexed, the inner erect and enlarging in fruit.

2. **Oxyria.** Sepals 4. Stigmas 2. Achene orbicular-winged. Leaves reniform.
3. **Rumex.** Sepals 6. Stigmas 3. Achene 3-angled.

++ ++ Sepals 5 (sometimes 4), equal and erect in fruit. Achene triangular or lenticular.

4. **Polygonum.** Embryo slender, curved around one side of the albumen. Pedicels mostly fascicled.
5. **Fagopyrum.** Embryo in the albumen, its very broad cotyledons twisted-plaited.
6. **Polygonella.** Embryo slender, nearly straight. Pedicels solitary. Leaves jointed at base.

+ + Stipules obsolete; ovule hanging from the apex of a slender stalk.

7. **Brunnichia.** Calyx 5-parted, in fruit with a wing decurrent on the pedicel. Tendril-climber.

### 1. ERIÓGONUM, Michx.

Flowers perfect, involucrate; involucre 4 – 8-toothed or lobed, usually many-flowered; the more or less exserted pedicels intermixed with narrow scarious bracts. Calyx 6-parted or -cleft, colored, persistent about the achene. Stamens 9, upon the base of the calyx. Styles 3; stigmas capitate. Achene triangular. Embryo straight and axile, with foliaceous cotyledons. — Annuals or perennials, with radical or alternate or whorled entire leaves, without stipules. (Name from ἔριον, *wool*, and γόνυ, *knee*.)

1. **E. ánnuum,** Nutt. Annual, erect, leafy, naked above, 2° high, white-floccose-tomentose throughout; leaves oblong-lanceolate, acute at both ends, short-petiolate, flat; bracts small, triangular; involucres numerous in terminal cymes, turbinate, shortly pedicelled, 1 – 1½″ long, very tomentose; flowers white, the outer sepals oblong-obovate, 1″ long or less. — Central Kan. to Col., and southward.

## 2. OXÝRIA, Hill. MOUNTAIN SORREL.

Calyx herbaceous, of 4 sepals; the outer smaller and spreading, the inner broader and erect (but unchanged) in fruit. Stamens 6. Stigmas 2, sessile, tufted. Achene lenticular, thin, flat, much larger than the calyx, surrounded by a broad veiny wing. Seed flattened contrary to the wing. Embryo straight, in the centre of the albumen, slender. — Low alpine perennial, with round-kidney-form and long-petioled leaves chiefly from the root, obliquely truncate sheaths, and small greenish flowers clustered in panicled racemes on a slender scape. (Name from ὀξύς, *sour*, in allusion to the acid leaves.)

1. **O. dígyna,** Hill. Leaves all round-kidney-form, usually notched at the end; fruit orbicular. — Alpine region of the White Mts., and far north and westward. (Eu.)

## 3. RÙMEX, L. DOCK. SORREL.

Calyx of 6 sepals; the 3 outer herbaceous, sometimes united at base, spreading in fruit; the 3 inner larger, somewhat colored, enlarged after flowering (in fruit called *valves*) and convergent over the 3-angled achene, veiny, often bearing a grain-like tubercle on the back. Stamens 6. Styles 3; stigmas tufted. Embryo slightly curved, lying along one side of the albumen, slender. — Coarse herbs, with small and homely (mostly green) flowers, which are crowded and commonly whorled in panicled racemes; the petioles somewhat sheathing at base. (The ancient Latin name; of unknown etymology.)

§ 1. LÁPATHUM. (DOCK.) *Flowers perfect or monœciously polygamous; herbage not sour or scarcely so; none of the leaves halberd-shaped.* (*Flowering through the summer.*)

* *Perennials,* 1 – 7° *high, mostly with fusiform roots; valves not bearing bristles.*

+– *Valves (large,* 3″ *broad or more, thin) all naked or one with a small grain.*

**R. PATIÉNTIA,** L. (PATIENCE DOCK.) A very tall species, with ovate-oblong and lanceolate leaves (broadest above the base), those from the root 2 – 3° long, and one of the heart-shaped nearly or quite entire valves (3″ broad) bearing a small grain, or its midrib thickened at base. — N. Eng. and N. Y. (Adv. from Eu.)

1. **R. venòsus,** Pursh. Stems from running rootstocks, erect (1° high or less), with conspicuous dilated stipules; leaves on short but rather slender petioles, ovate or oblong to lanceolate (3 – 6′ long), acute or acuminate, only the lowest obtuse at base; panicle nearly sessile, short, dense in fruit; valves entire, glandless, broadly cordate with a deep sinus, 9 – 12″ in diameter, bright rose-color. — Sask. to central Mo. and Kan., and westward.

+- *Valves smaller, one or more of them conspicuously grain-bearing.*

++ *Indigenous; leaves not wavy, none heart-shaped, except the lowest of* n. 5.

2. **R. Británnica,** L. (GREAT WATER-DOCK.) Tall and stout (5-6° high); leaves oblong-lanceolate, rather acute at both ends, transversely veined, and with obscurely erose-crenulate margins (the lowest, including the petiole, 1-2° long, the middle rarely truncate or obscurely cordate at base); racemes upright in a large compound panicle, nearly leafless; whorls crowded; *pedicels capillary, nodding, about twice the length of the fruiting calyx; the valves orbicular or round-ovate,* very obtuse, obscurely heart-shaped at base, *finely reticulated,* entire or repand-denticulate (2-3″ broad), all grain-bearing. (R. orbiculatus, *Gray.*) — Wet places, N. Eng. to N. J., west to Minn. and Kan.

3. **R. altíssimus,** Wood. (PALE DOCK.) Rather tall (2-6° high); *leaves ovate- or oblong-lanceolate,* acute, pale, thickish, obscurely veiny (the cauline 3-6′ long, contracted at base into a short petiole); racemes spike-like and panicled, nearly leafless; whorls crowded; *pedicels nodding, shorter than the fruiting calyx; valves broadly ovate* or obscurely heart-shaped, obtuse or acutish, entire, loosely reticulated (about 2″ broad), one with a conspicuous grain, the others with a thickened midrib or naked. (R. Britannica, *Gray;* not *L.*) — Moist grounds, N. Y. and N. J. to Minn. and Kan.

4. **R. salicifòlius,** Weinmann. (WHITE DOCK.) Rather low (1-3° high); root white; *leaves narrowly or linear-lanceolate,* or the lowest oblong; whorls much crowded; *pedicels much shorter than the fruiting calyx; valves deltoid-ovate,* obtusish or acutish (about 1½″ long), one, two or sometimes all with a conspicuous often very large grain; otherwise nearly as n. 3. — Salt marshes, from Newf. to N. Eng., about the Great Lakes, and far westward.

5 **R. verticillàtus,** L. (SWAMP DOCK.) Rather tall (3-5° high); leaves lanceolate or oblong-lanceolate, rather obtuse, thickish, pale-green, the lowest often heart-shaped at base; racemes nearly leafless, elongated, loose, the whorls crowded or the lower ones distant; fruit-bearing *pedicels slender, club-shaped, abruptly reflexed,* 3-4 *times longer than the fruiting calyx; valves dilated-rhomboid, obtusely somewhat pointed, strongly rugose-reticulated,* each bearing a very large grain. — Wet swamps, common.

++ ++ *Naturalized European weeds; lower leaves mostly heart-shaped at base.*

**R.** CRÍSPUS, L (CURLED DOCK.) Smooth (3-4° high); *leaves with strongly wavy-curled margins, lanceolate,* acute, the lower truncate or scarcely heart-shaped at base; *whorls crowded in prolonged wand-like racemes, leafless above; valves round-heart-shaped, obscurely denticulate* or entire, mostly all grain-bearing. — In cultivated and waste ground, very common. A hybrid of this with the next is reported from Mass., N. Y., and Md.

**R.** OBTUSIFÒLIUS, L. (BITTER DOCK.) Stem roughish; *lowest leaves ovate-heart-shaped, obtuse,* rather downy on the veins beneath, somewhat wavy-margined, the *upper oblong-lanceolate, acute; whorls loose and distant; valves ovate-halberd-shaped, with some sharp awl-shaped teeth at base,* strongly reticulated, one of them principally grain-bearing. — Fields, etc., common.

**R.** SANGUÍNEUS, L. *Leaves oblong-lanceolate,* often fiddle-shaped, wavy-margined; *whorls distant, in long slender leafless spikes;* pedicels very short, jointed at base; *valves narrowly oblong, obtuse, entire,* one at least grain-bearing; veins of the leaf red, or green. — Waste and cultivated ground.

**R.** CONGLOMERÀTUS, Murray. (SMALLER GREEN DOCK.) Like the last, but leaves not fiddle-shaped, and panicle leafy; pedicels short, jointed below the middle; valves acutish, all grain-bearing. — Moist places.

* * *Annuals, low; valves bearing long awns or bristles.*

6. **R. marítimus,** L. (GOLDEN DOCK.) Minutely pubescent, diffusely branched, 6–12′ high; leaves lance-linear, wavy-margined, the lower auricled or heart-shaped at base; whorls excessively crowded in leafy and compact or interrupted spikes; valves rhombic-oblong, lance-pointed, each bearing 2–3 long awn-like bristles on each side, and a large grain on the back. — Sea-shore, Mass. to N. C.; also from Ill. to Minn., and westward.

§ 2. ACETÒSA. (SORREL.) *Flowers diœcious, small, in a terminal naked panicle; herbage sour; some leaves halberd-shaped; smooth perennials, spreading by running rootstocks, flowering in spring.*

7. **R. hastátulus,** Baldw. Stem simple, 1–2° high; leaves nearly as in the next; *pedicels jointed at or below the middle; valves of the fruiting calyx round-heart-shaped,* thin, finely reticulated, naked, *many times larger than the achene.* (R. Engelmanni, *Ledeb.*) — S. W. Ill. to E. Kan., Tex., and Fla.; Riverhead, Long Island (*Young*).

**R.** ACETOSÉLLA, L. (FIELD or SHEEP SORREL.) Low (6–12′ high); leaves narrow-lanceolate or linear, halberd-form, at least those of the root, the narrow lobes entire; *pedicels jointed with the flower; valves scarcely enlarging in fruit, ovate,* naked. — Abundant everywhere. (Nat. from Eu.)

**R.** ACETÒSA, L. (SORREL DOCK.) Like the last, but *taller* (1–3° high); leaves oblong or broadly lanceolate; *valves enlarging in fruit and orbicular, the outer reflexed.* — Charlotte, Vt., and Penn Yan, N. Y. (Nat. from Eu.)

## 4. POLÝGONUM, Tourn. KNOTWEED.

Calyx mostly 5-parted; the divisions often petal-like, all erect in fruit, withering or persistent. Stamens 4–9. Styles or stigmas 2 or 3; achene accordingly lenticular or 3-angular. Embryo placed in a groove on the outside of the albumen and curved half-way around it; the radicle and usually the cotyledons slender. — Pedicels jointed. Ours all herbaceous, with fibrous roots (except n. 19), flowering through late summer and early autumn. (Name composed of πολύς, *many,* and γόνυ, *knee,* from the numerous joints.)

§ 1. POLYGONUM proper. *Flowers in axillary fascicles or spicate with foliaceous bracts; leaves and bracts jointed upon a very short petiole adnate to the short sheath of the 2-lobed or lacerate scarious stipules; stems striate; calyx* 5–6-*parted, usually more or less herbaceous; stamens* 3–8, *the* 3 *inner filaments broad at base; styles* 3; *cotyledons incumbent; albumen horny; glabrous annuals, except* n. 1. (§ Avicularia, *Meisn.*)

* *Leafy throughout.*

1. **P. marítimum,** L. *Perennial,* at length woody at base (or sometimes annual), prostrate, *glaucous,* the stout stems very shortly jointed; *leaves thick,* oval to linear-oblong (3–10″ long), exceeding the nodes; stipules very conspicuous; sepals petaloid; stamens 8; *achene smooth and shining, exserted.* — Sea-coast from Mass. to Ga. (Eu.)

2. **P. aviculàre,** L. Slender, *mostly prostrate or ascending, bluish-green;* leaves oblong to lanceolate (3–10″ long), usually acute or acutish; *sepals hardly* 1″ *long,* green with pinkish margins; stamens 8 (rarely 5); achene dull and minutely granular, mostly included. — Common everywhere in yards, waste places, etc. (Eu., Asia.)

3. **P. eréctum,** L. *Stouter, erect* or ascending (1 – 2° high), *yellowish;* leaves oblong or oval (½ – 2½′ long), usually obtuse; *flowers mostly* 1½″ *long,* often yellowish, on more or less exserted pedicels; stamens 5 – 6; achene dull, included. (P. aviculare, var. erectum, *Roth.*) — Common, by waysides, etc.

* * *Leaves much reduced above and bract-like.*

4. **P. ramosíssimum,** Michx. Erect or ascending (2 – 4° high), *yellowish-green;* leaves lanceolate to linear (1 – 2½′ long), acute; *flowers* and achene *as in* n. 3, but sepals more frequently 6, the *stamens* 3 – 6, and the achene mostly smooth and shining. — Sandy shores and banks of streams, E. Mass. to N. Y., west to Minn., Ark., Tex., and far westward.

5. **P. ténue,** Michx. *Stem angled,* erect (½ – 1½° high), glabrous, or slightly scabrous at the nodes; *leaves* narrowly linear to lanceolate (1 – 2′ long), 3-*nerved,* acute at each end and often cuspidate, the margins somewhat scabrous and at length revolute; *flowers* often solitary, *nearly sessile; stamens* 8; achene included, dull black. — Dry soil, N. Eng. to S. C., west to Minn., Mo., and Tex.

6. **P. campòrum,** Meisn. *Stem terete,* erect or ascending (2 – 3° high), glabrous; *leaves deciduous,* linear to oblong, usually short; *pedicels slender, exserted from the scarious sheaths;* stamens 8. — E. Kan. to Tex.

§ 2. PERSICÀRIA. *Flowers in dense spikes, with small scarious bracts; leaves not jointed on the petiole; sheaths cylindrical, truncate, entire, naked or ciliate-fringed or margined; calyx colored,* 5-*parted, appressed to the fruit; stamens* 4 – 8; *filaments filiform; cotyledons accumbent.*

* *Sheaths and bracts not ciliate or fringed; sepals not punctate; style* 2-*cleft.*

7. **P. lapathifòlium,** L. Annual, branching, 1 – 4° high, glabrous or the peduncles often minutely glandular; leaves lanceolate, attenuate upward from near the cuneate base and acuminate, somewhat scabrous with short appressed hairs on the midrib and margin, or rarely floccose-tomentose beneath; sheaths and bracts rarely somewhat ciliolate; spikes oblong to linear (½ – 2′ long), dense, erect or nearly so; flowers white or pale rose-color; stamens 6; achene ovate, rarely 1″ broad. (P. nodosum, *Pers.* P. incarnatum, *Man.*, in part.) — Wet places; N. Eng. and Can. to Ill., Wisc., and far westward. Very variable. (Eu.)

Var. **incarnàtum,** Watson. Leaves often large (6 – 12′ long, 1 – 3′ wide); spikes more slender and elongated (2 – 4′ long), nodding. (P. incarnatum, *Ell.*) — Penn. to Ill., Mo., and southward.

Var. **incànum,** Koch. Low (6 – 12′ high); leaves small, obtusish, more or less hoary beneath with floccose tomentum; spikes short. — Cayuga Lake, N. Y., Ont., shores of L. Superior, and northwestward (Eu.)

8. **P. Pennsylvánicum,** L. A similar species, but the *branches above and especially the peduncles beset with stipitate glands;* flowers larger and often bright rose-color, in short erect spikes, often on exserted pedicels; stamens usually 8; achene nearly orbicular, over 1″ broad. — Moist soil, in open waste places, common.

9. **P. amphíbium,** L. Perennial, *aquatic* or rooting in the mud, *stout and glabrous* or nearly so, not branching above the rooting base; *leaves usually floating, thick,* smooth and shining above, mostly long-petioled, *elliptical*

*to oblong* or sometimes lanceolate, *acutish*, cuneate or cordate at base (2 – 5′ long); spike terminal, *dense, ovate or oblong* (½ – 1′ long); flowers bright rose-color (1½ – 3″ long); the 5 stamens and 2-cleft style exserted. — Widely distributed and rather common. (Eu., Asia.)

10. **P. Muhlenbérgii,** Watson. Perennial, in muddy or dry places, decumbent or suberect, *scabrous with short appressed or glandular hairs; leaves thinner, rather broadly lanceolate, narrowly acuminate* (4 – 7′ long); *spikes more elongated* (1 – 3′ long), often in pairs; flowers and fruit nearly as in the last. (P. amphibium, var. terrestre, *Gray*, Manual; not *Leers.*) — N. Eng. to Fla., westward across the continent.

* * *Sheaths and bracts bristly ciliate or the sheaths foliaceously margined.*

+ *Sepals not punctate; style 2-cleft; achene somewhat flattened.*

11. **P. Hartwrightii,** Gray. *Perennial*, very closely allied to n. 9, growing usually in mud, the ascending stems rooting at base and very leafy, *more or less rough-hairy*, at least on the sheaths and bracts, the former ciliate and *often with abruptly spreading foliaceous borders;* leaves rather narrow (2 – 7′ long), on very short petioles; *flowers and fruit as in* n. 9. — N. Eng. and N. Y., to Minn., Iowa, and far westward. When growing in water the floating leaves are thicker and glabrous.

12. **P. Càreyi,** Olney. Annual, erect, the stem (3 – 5° high) and peduncles *glandular-bristly; leaves narrowly lanceolate*, attenuate to both ends, roughish; sheaths ciliate or sometimes margined; spikes slender, loose and nodding; flowers purplish; *stamens mostly* 5. — Shady swamps, S. Maine and N. H. to Penn. and Ont.

**P.** ORIENTÀLE, L. (PRINCE'S FEATHER.) Tall branching annual, *soft-hairy; leaves ovate* or oblong, pointed, distinctly petioled; *sheaths* ciliate or *often with an abrupt spreading border;* flowers large, bright rose-color, *in dense cylindrical nodding spikes; stamens* 7. — Sparingly escaped from gardens into waste grounds. (Adv. from India.)

**P.** PERSICÀRIA, L. (LADY'S THUMB.) Nearly *smooth and glabrous* (12 – 18′ high); sheaths more or less bristly-ciliate; leaves lanceolate, pointed, roughish, often marked with a dark triangular or lunar spot near the middle; *spikes ovoid or oblong, dense, erect, on smooth* (or at least not glandular) *peduncles;* stamens mostly 6; *styles half* 2 – 3-*cleft;* achene gibbous-flattened or sometimes triangular, smooth and shining. — Waste and damp places, very common. (Nat. from Eu.)

+ + *Sepals conspicuously dotted and leaves punctate* (*except* n. 13), *with acrid juice; style mostly 3-parted, and achene triangular; sheaths bristle-fringed.*

13. **P. hydropiperoides,** Michx. (MILD WATER-PEPPER.) *Perennial, not acrid;* stem smooth (1 – 3° high), branching; the narrow *sheaths hairy;* leaves narrowly lanceolate, sometimes oblong; *spikes erect, slender*, sometimes filiform, often interrupted at base (1 – 2½′ long); flowers small, flesh-color or nearly white; *sepals not dotted; stamens* 8; *achene sharply triangular, smooth and shining.* — Wet places and in shallow water; common, especially southward.

14. **P. Hydrópiper,** L. (COMMON SMARTWEED or WATER-PEPPER.) *Annual*, 1 – 2° high, smooth; leaves narrowly to linear-lanceolate; *spikes nodding*, usually short or interrupted; flowers mostly greenish; *stamens* 6; style 2 – 3-parted; *achene dull*, minutely striate. — Moist or wet grounds; apparently introduced eastward, but indigenous north and westward. (Eu.)

15. **P. àcre,** HBK. (WATER SMARTWEED.) *Perennial,* nearly smooth; stems rooting at the decumbent base, 2 – 5° high; leaves larger and longer than in the last, taper-pointed; *spikes erect; flowers whitish,* sometimes flesh-color; *stamens* 8; style *mostly* 3-*parted; achene smooth and shining.* — Wet places; common, especially southward.

§ 3. BISTÓRTA. *Glabrous alpine perennials, with thick creeping rootstocks and simple stems; flowers in a spike-like raceme; calyx colored, deeply* 5-*cleft; stamens* 8; *styles* 3, *long.*

16. **P. vivíparum,** L. Smooth, dwarf (4 – 8′ high), bearing a linear erect spike of flesh-colored flowers (or often little red bulblets in their place); leaves lanceolate. — Alpine summits of N. Eng., shores of L. Superior, and northward. (Eu.)

§ 4. TOVÀRA. *Perennials; flowers in loose naked long and slender spikes; calyx rather herbaceous (greenish), unequally* 4-*parted; stamens* 5; *styles* 2, *distinct, rigid and persistent on the smooth lenticular achene.*

17. **P. Virginiànum,** L. Almost smooth; stem terete, upright (2 – 4° high); sheaths cylindrical, hairy and fringed; leaves ovate, or the upper ovate-lanceolate, taper-pointed, rounded at the base, short-petioled, rough-ciliate (3 – 6′ long); flowers 1 – 3 from each bract, somewhat curved, the styles deflexed in fruit, minutely hooked. — Thickets in rich soil, common. (Asia.)

§ 5. TINIÀRIA. *Annuals or perennials, mostly twining or climbing, and with petioled cordate or sagittate leaves; flowers in loose panicles or racemes or in terminal or axillary clusters; calyx green with colored margins,* 5- (*rarely* 4-) *parted; stamens mostly* 8; *styles or stigmas* 3 (2 in n. 18).

* *Annuals, erect, or somewhat climbing by reflexed prickles on the angles of the stem and petioles; sepals (pale rose-color or white) not keeled; bracts chaff-like.*

18. **P. arifòlium,** L. (HALBERD-LEAVED TEAR-THUMB.) *Stem grooved-angled; leaves halberd-shaped,* taper-pointed, *long-petioled;* flowers somewhat racemed (few); peduncles glandular-bristly; calyx often 4-parted; *stamens* 6; *styles* 2, very short; *achene lenticular* (large). — Low grounds. (Asia.)

19. **P. sagittàtum,** L. (ARROW-LEAVED TEAR-THUMB.) *Stem* 4-*angled; leaves arrow-shaped, short-petioled;* flowers capitate; peduncles smooth; *stamens mostly* 8; *styles* 3, slender; *achene sharply* 3-*angled.* — Low grounds, common. — Slender, smooth except the angles of the stem and midrib beneath, which are armed with fine and very sharp saw-toothed prickles. (Asia.)

* * *Stems not prickly; calyx with the* 3 *outer divisions keeled, at least in fruit; flowers in loose panicled racemes; bracts short-sheathing.*

**P.** CONVÓLVULUS, L. (BLACK BINDWEED.) *Annual,* twining or procumbent, low, *roughish, the joints naked;* leaves halberd-heart-shaped, pointed; flowers in small interrupted corymbose racemes; *outer calyx-lobes keeled;* achene smoothish. — Cult. and waste grounds, common. (Nat. from Eu.)

20. **P. cilinòde,** Michx. *Perennial, minutely downy; the sheaths fringed* at the base with reflexed bristles; leaves heart-shaped and slightly halberd-shaped, taper-pointed; racemes panicled; *calyx-lobes obscurely keeled;* achene very smooth and shining. — Copses and rocky hills, N. Eng. to mountains of N. C., west to Mich. and Minn. Climbing 3 – 9° high.

21. **P. dumetòrum,** L., var **scándens,** Gray. (CLIMBING FALSE BUCKWHEAT.) *Perennial, smooth; sheaths naked;* leaves heart-shaped or slightly halberd-shaped, pointed; racemes interrupted, leafy; the 3 outer *calyx-lobes strongly keeled and in fruit winged;* achene smooth and shining. — Moist thickets, common. Twining 8 – 12° high over bushes.

**P.** CUSPIDÀTUM, Sieb. & Zucc. Perennial, erect, stout and tall, glabrous except the loose axillary panicled racemes; leaves round-ovate, shortly acuminate, truncate or cordate at base; outer sepals broadly winged in fruit. — Occasionally escaped from gardens. (Japan.)

## 5. FAGOPỲRUM, Tourn. BUCKWHEAT.

Calyx petal-like, equally 5-parted, withering and nearly unchanged in fruit. Stamens 8. Styles 3; stigmas capitate. Achene 3-sided, longer than the calyx. Embryo large, in the centre of the albumen, which it divides into 2 parts, with very broad and foliaceous plaited and twisted cotyledons. — Glabrous annuals, with triangular-heart-shaped or halberd-shaped leaves, semicylindrical sheaths, and corymbose racemes or panicles of white flowers, often tinged with green or rose-color. (Name from *fagus*, the beech, and πυρός, *wheat*, from the resemblance of the grain to the beech-nut; so the English name Buckwheat, from the German *buche*, beech.)

**F.** ESCULÉNTUM, Moench. (BUCKWHEAT.) Smoothish; flower with 8 honey-bearing yellow-glands interposed between the stamens; achene acute and entire, smooth and shining. — Old fields, remaining as a weed after cultivation, and escaping into copses. June – Sept. (Adv. from Eu.)

**F.** TATÁRICUM, Gaertn. (INDIA-WHEAT.) Flowers very small, on shorter pedicels; achene very dull and roughish, the sides sulcate. — An occasional escape from cultivation. (Adv. from Asia.)

## 6. POLYGONÉLLA, Michx.

Flowers perfect or polygamous-diœcious. Calyx 5-parted, petaloid, loosely persistent about the achene, the 3 inner divisions often enlarging in fruit, in which case the outer are usually spreading. Stamens 8. Styles 3, and achene 3-angular Embryo slender, straight or nearly so, toward one side of the albumen. — Slender glabrous annuals or perennials, with alternate mostly linear leaves jointed at the base, and rather rigid truncate or oblique naked sheaths and bracts. Flowers on solitary jointed pedicels (nodding in fruit) in slender panicled racemes. (Diminutive of Polygonum.)

1. **P. articulàta,** Meisn. Annual, erect, branching, glaucous, 4 – 12′ high; leaves linear-filiform, deciduous; flowers rose-color, nodding, in very slender racemes, the calyx a little enlarged in fruit; 3 inner filaments dilated at base; achene exserted, smooth. (Polygonum articulatum, *Gray*.) — Dry, sandy soil; on the coast from Maine to N. J., and along the Great Lakes.

## 7. BRUNNÍCHIA, Banks.

Calyx 5-parted; the divisions somewhat petal-like, oblong, connivent and coriaceous in fruit, the base and almost the whole length of the pedicel winged on one side. Stamens 8; filaments capillary. Styles 3, slender; stigmas depressed-capitate. Ovule pendulous on a slender erect funiculus; seed erect, 6-grooved. Achene obtusely triangular, partly 3-celled, enclosed in the indurated calyx. Embryo in one of the angles of the mealy albumen, somewhat curved. — Somewhat shrubby with grooved stems, climbing by tendrils from the ends of the branches. (Named for *F. Brunnich*, a Danish naturalist.)

1. **B. cirrhòsa,** Banks. Glabrous; leaves ovate or heart-shaped, pointed, entire; petioles dilated at base and partly clasping, but with no distinct sheath or stipules; flowers greenish, 2 – 5 in a fascicle from the axil of an awl-shaped bract, these crowded in axillary and terminal racemes; pedicel jointed near the base; fruiting calyx with the wing 1′ long. — S. Ill. to S. C. and Fla.

## ORDER 90. PODOSTEMÀCEÆ. (RIVER-WEED FAMILY.)

*Aquatics, growing on stones in running water, some with the aspect of* Sea-weeds, *or others of* Mosses *or* Liverworts; *the minute naked flowers bursting from a spathe-like involucre as in* Liverworts, *producing a 2 – 3-celled many-seeded ribbed capsule;* — represented in North America by

### 1. PODOSTÈMON, Michx. RIVER-WEED.

Flowers solitary, nearly sessile in a tubular sac-like involucre, destitute of floral envelopes. Stamens 2, borne on one side of the stalk of the ovary, with their long filaments united into one for more than half their length, and 2 short sterile filaments, one on each side; anthers 2-celled. Stigmas 2, awl-shaped. Capsule pedicellate, oval, 8-ribbed, 2-celled, 2-valved. Seeds minute, very numerous on a thick persistent central placenta, destitute of albumen. — Leaves 2-ranked. (Name from πoῦς, *foot*, and στήμων, *stamen;* the two stamens being apparently raised on a stalk by the side of the ovary.)

1. **P. ceratophýllus,** Michx. Leaves rigid or horny, dilated into a sheathing base, above mostly forked into thread-like or linear lobes. — Not rare in shallow streams, E. Mass. to Minn., and southward. July – Sept. — A small olive-green plant, of firm texture, resembling a Seaweed, tenaciously attached to loose stones by fleshy disks or processes in place of roots.

## ORDER 91. ARISTOLOCHIÀCEÆ. (BIRTHWORT FAMILY.)

*Twining shrubs, or low herbs, with perfect flowers, the conspicuous lurid calyx valvate in bud and coherent (at least at base) with the 6-celled ovary, which forms a many-seeded 6-celled capsule or berry in fruit. Stamens 6 – 12, more or less united with the style; anthers adnate, extrorse.* — Leaves petioled, mostly heart-shaped and entire. Seeds anatropous, with a large fleshy rhaphe, and a minute embryo in fleshy albumen. A small family of bitter-tonic or stimulant, sometimes aromatic plants.

1. **Asarum.** Stemless herbs. Stamens 12, with more or less distinct filaments.
2. **Aristolochia.** Caulescent herbs or twining shrubs. Stamens 6, the sessile anthers adnate to the stigma.

### 1. ÁSARUM, Tourn. ASARABACCA. WILD GINGER.

Calyx regular; the limb 3-cleft or parted. Stamens 12, with more or less distinct filaments, their tips usually continued beyond the anther into a point. Capsule rather fleshy, globular, bursting irregularly or loculicidal. Seeds large, thick. — Stemless perennial herbs, with aromatic-pungent creeping rootstocks bearing 2 or 3 scales, then one or two kidney-shaped or heart-shaped leaves on long petioles, and a short-peduncled flower close to the ground in the lower axil; in spring. (An ancient name, of obscure derivation.)

§ 1. *Calyx-tube wholly adnate to the ovary, the tips inflexed in bud; filaments slender, much longer than the short anthers; style barely 6-lobed at the summit, with 6 radiating thick stigmas; leaves a single pair, unspotted.*

1. **A. Canadénse,** L. Soft-pubescent; leaves membranaceous, kidney-shaped, more or less pointed (4 – 5′ wide when full grown); calyx bell-shaped, the upper part of the short-pointed lobes widely and abruptly spreading, brown-purple inside. — Hillsides in rich woods; common, especially northward.

§ 2. *Calyx-tube inflated bell-shaped, somewhat contracted at the throat, its base adnate to the lower half of the ovary; limb 3-cleft, short; anthers sessile or nearly so, oblong-linear; styles 6, fleshy, diverging, 2-cleft, bearing a thick extrorse stigma below the cleft; leaves thickish, persistent, usually only one each year, often whitish-mottled; peduncle very short; rootstocks clustered, ascending.*

2. **A. Virgínicum,** L. Nearly glabrous; *leaves round-heart-shaped* (about 2′ wide); calyx short, reticulated within; anthers pointless. — Va. to Ga., in and near the mountains.

3. **A. arifòlium,** Michx. *Leaves halberd-heart-shaped* (2 – 4′ long); calyx oblong-tubular, with very short and blunt lobes; *anthers obtusely short-pointed.* — Va. to Fla.

### 2. ARISTOLÒCHIA, Tourn. BIRTHWORT.

Calyx tubular; the tube variously inflated above the ovary, mostly contracted at the throat. Stamens 6, the sessile anthers wholly adnate to the short and fleshy 3 – 6-lobed or angled style. Capsule naked, septicidally 6-valved. Seeds very flat. — Twining, climbing, or sometimes upright perennial herbs or shrubs, with alternate leaves and lateral or axillary greenish or lurid-purple flowers. (Named from reputed medicinal properties.)

§ 1. *Calyx-tube bent like the letter S, enlarged at the two ends, the small limb obtusely 3-lobed; anthers contiguous in pairs (making 4 cells in a row under each of the three truncate lobes of the stigma); low herbs.*

1. **A. Serpentària,** L. (VIRGINIA SNAKEROOT.) Stems (8 – 15′ high) branched at base, pubescent; leaves ovate or oblong (or narrower) from a heart-shaped base or halberd-form, mostly acute or pointed; flowers all next the root, short-peduncled. — Rich woods, Conn. to Fla., west to Mich., Mo., and La. July. — The fibrous, aromatic-stimulant root is well known in medicine.

§ 2. *Calyx-tube strongly curved like a Dutch pipe, contracted at the mouth, the short limb obscurely 3-lobed; anthers contiguous in pairs under each of the 3 short and thick lobes of the stigma; very tall twining shrubs; flowers from one or two of the superposed accessory axillary buds.*

2. **A. Sìpho,** L'Her. (PIPE-VINE. DUTCHMAN'S PIPE.) *Nearly glabrous; leaves round-kidney-shaped* (sometimes 8 – 12′ broad); peduncles with a clasping bract; calyx (1½′ long) with a brown-purple *abrupt flat border.* — Rich woods, Penn. to Ga., west to Minn. and Kan. May.

3. **A. tomentòsa,** Sims. *Downy or soft-hairy; leaves round-heart-shaped,* very veiny (3 – 5′ long); *calyx yellowish,* with an *oblique* dark purple closed *orifice* and a *rugose reflexed limb.* — Rich woods, mountains of N. C. to Fla., west to S. Ill. and Mo. June.

§ 3. *Calyx-tube straight, open, with ample* 6-*lobed limb, the lobes appendaged; anthers equidistant; erect herbs; flowers in axillary cymose fascicles.*

**A.** CLEMÁTITIS, L., with long-petioled cordate leaves, from Europe, is said to have permanently escaped near Ithaca, N. Y. (*Dudley*).

## ORDER 92. PIPERÀCEÆ. (PEPPER FAMILY.)

*Herbs, with jointed stems, alternate entire leaves, and perfect flowers in spikes, entirely destitute of floral envelopes, and with* 3–5 *more or less separate or united ovaries.* — Ovules few, orthotropous. Embryo heart-shaped, minute, contained in a little sac at the apex of the albumen. — The characters are those of the Tribe *Saurureæ*, the *Piperaceæ* proper (wholly tropical) differing in having a 1-celled and 1-ovuled ovary.

### 1. SAURÙRUS, L. LIZARD'S-TAIL.

Stamens mostly 6 or 7, hypogynous, with distinct filaments. Fruit somewhat fleshy, wrinkled, of 3–4 indehiscent carpels united at base. Stigmas recurved. Seeds usually solitary, ascending. — Perennial marsh herbs, with heart-shaped converging-ribbed petioled leaves, without distinct stipules; flowers (each with a small bract adnate to or borne on the pedicel) crowded in a slender wand-like and naked peduncled terminal spike or raceme (its appearance giving rise to the name, from σαῦρος, *a lizard*, and οὐρά, *tail*).

1. **S. cérnuus,** L. Flowers white, fragrant; spike nodding at the end; bract lanceolate; filaments long and capillary. — Swamps, Conn. to Ont., Minn., Mo., and southward. June–Aug.

## ORDER 93. LAURÀCEÆ. (LAUREL FAMILY.)

*Aromatic trees or shrubs, with alternate simple leaves mostly marked with minute pellucid dots, and flowers with a regular calyx of* 4 *or* 6 *colored sepals, imbricated in* 2 *rows in the bud, free from the* 1-*celled and* 1-*ovuled ovary, and mostly fewer than the stamens; anthers opening by* 2 *or* 4 *uplifted valves.* — Flowers clustered. Style single. Fruit a 1-seeded berry or drupe. Seed anatropous, suspended, with no albumen, filled by the large almond-like embryo.

* Flowers perfect, panicled; stamens 12, three of them sterile, three with extrorse anthers.

1. **Persea.** Calyx persistent. Anthers 4-celled. Evergreen.

* * Flowers diœcious, or nearly so; stamens in the sterile flowers 9. Leaves deciduous.

2. **Sassafras.** Flowers in corymb- or umbel-like racemes. Anthers 4-celled, 4-valved.
3. **Litsea.** Flowers few in involucrate umbels. Anthers 4-celled, 4-valved.
4. **Lindera.** Flowers in umbel-like clusters. Anthers 2-celled, 2-valved.

### 1. PÉRSEA, Gaertn. ALLIGATOR PEAR.

Flowers perfect, with a 6-parted calyx, persistent at the base of the berry-like fruit. Stamens 12, in four rows, the 3 of the innermost row sterile and gland-like, the rest bearing 4-celled anthers (i. e. with each proper cell divided transversely into two), opening by as many uplifted valves; the anthers of 3 stamens turned outward, the others introrse. — Trees, with persistent entire leaves, and small panicled flowers. (An ancient name of some Oriental tree.)

1. **P. Carolinénsis,** Nees. (RED BAY.) Hoary with a fine down, at least when young; leaves oblong, pale, soon smooth above; peduncle bearing few flowers in a close cluster; sepals downy, the outer shorter; berries dark blue, on a red stalk. — Swamps, S. Del. to Fla. and Tex. May. A small tree.

## 2. SÁSSAFRAS, Nees.

Flowers diœcious, with a 6-parted spreading calyx; the sterile kind with 9 stamens inserted on the base of the calyx in 3 rows, the 3 inner with a pair of stalked glands at the base of each; anthers 4-celled, 4-valved; fertile flowers with 6 short rudiments of stamens and an ovoid ovary. Drupe ovoid (blue), supported on a club-shaped and rather fleshy reddish pedicel. — Trees, with spicy-aromatic bark, and very mucilaginous twigs and foliage; leaves deciduous, often lobed. Flowers greenish-yellow, naked, in clustered and peduncled corymbed racemes, appearing with the leaves, involucrate with scaly bracts. Leaf-buds scaly. (The popular name, applied by the early French settlers in Florida.)

1. **S. officinàle,** Nees. Trees 15 – 125° high, with yellowish-green twigs; leaves ovate, entire, or some of them 3-lobed, soon glabrous. — Rich woods, E. Mass. to S. Ont., Mich., E. Iowa and Kan., and south to the Gulf. April.

## 3. LÍTSEA, Lam.

Flowers diœcious, with a 6-parted deciduous calyx; the sterile with 9 stamens in 3 rows; their anthers all introrse, 4-celled, 4-valved; fertile flowers with 12 or more rudiments of stamens and a globular ovary. Drupe globular. — Shrubs or trees, with entire leaves, and small flowers in axillary clustered umbels. (Name of Chinese origin.)

1. **L. geniculàta,** Benth. & Hook. (POND SPICE.) Flowers (yellow) appearing before the deciduous oblong leaves, which are hairy on the midrib beneath; branches forked and divaricate, the branchlets zigzag; involucres 2 – 4-leaved, 2 – 4-flowered; fruit red. (Tetranthera geniculata, *Nees.*) — Swamps, Va. to Fla. April.

## 4. LÍNDERA, Thunb. WILD ALLSPICE. FEVER-BUSH.

Flowers polygamous-diœcious, with a 6-parted open calyx; the sterile with 9 stamens in 3 rows, the inner filaments 1 – 2-lobed and gland-bearing at base; anthers 2-celled and 2-valved; fertile flowers with 15 – 18 rudiments of stamens in 2 forms, and a globular ovary. Drupe obovoid, red, the stalk not thickened. — Shrubs, with deciduous leaves, and honey-yellow flowers in almost sessile lateral umbel-like clusters, appearing before the leaves (in our species); the clusters composed of smaller clusters or umbels, each of 4 – 6 flowers and surrounded by an involucre of 4 deciduous scales. Leaf-buds scaly. (Named for *John Linder*, a Swedish botanist of the early part of the 18th century.)

1. **L. Benzòin,** Blume. (SPICE-BUSH. BENJAMIN-BUSH.) *Nearly smooth* (6 – 15° high); *leaves oblong-obovate*, pale underneath. — Damp woods, N. Eng. to Ont., Mich., E. Kan., and southward. March, April.

2. **L. melissæfòlia,** Blume. Young branches and buds *pubescent; leaves oblong, obtuse or heart-shaped* at base, downy beneath; umbels few. — Low grounds, N. C. to Fla., west to S. Ill. and Mo. April.

## ORDER 94. THYMELÆÀCEÆ. (MEZEREUM FAMILY.)

*Shrubs, with acrid and very tough (not aromatic) bark, entire leaves, and perfect flowers with a regular and simple colored calyx, bearing usually twice as many stamens as its lobes, free from the 1-celled and 1-ovuled ovary,* which forms a berry-like drupe in fruit, with a single suspended anatropous seed. Embryo large; albumen little or none.

1. **Dirca.** Calyx tubular, without spreading lobes. Stamens and style exserted.
2. **Daphne.** Calyx-lobes (4) spreading. Stamens included. Style very short or none.

### 1. DÍRCA, L. LEATHERWOOD. MOOSEWOOD.

Calyx petal-like, tubular-funnel-shaped, truncate, the border wavy or obscurely about 4-toothed. Stamens 8, long and slender, inserted on the calyx above the middle, protruded, the alternate ones longer. Style thread-form; stigma capitate. Drupe oval (reddish). — A much-branched bush, with jointed branchlets, oval-obovate alternate leaves, at length smooth, deciduous, on very short petioles, the bases of which conceal the buds of the next season. Flowers light yellow, preceding the leaves, 3 or 4 in a cluster from a bud of as many dark-hairy scales, forming an involucre, from which soon after proceeds a leafy branch. (Name of uncertain derivation.)

1. **D. palústris,** L. Shrub 2 – 5° high; the wood white, soft, and very brittle; but the fibrous bark remarkably tough (used by the Indians for thongs, whence the popular names). — Damp rich woods, N. Brunswick to Minn. and Mo., south to the Gulf. April.

### 2. DÁPHNE, Linn. MEZEREUM.

Calyx salver-shaped or somewhat funnel-shaped, the border spreading and 4-lobed. Stamens 8, included; the anthers nearly sessile on the calyx-tube. Style very short or none; stigma capitate. Drupe red. — Hardy low shrub. (Mythological name of the nymph transformed by Apollo into a Laurel.)

**D.** MEZÈREUM, L. Shrub 1 – 3° high, with purple-rose-colored (rarely white) flowers, in lateral clusters on shoots of the preceding year, before the lanceolate very smooth green leaves; berries red. — Escaped from cultivation in Canada, Mass., and N. Y. Early spring. (Nat. from Eu.)

## ORDER 95. ELÆAGNÀCEÆ. (OLEASTER FAMILY.)

*Shrubs or small trees, with silvery-scurfy leaves and perfect or diœcious flowers;* further distinguished from the Mezereum Family by the erect or ascending albuminous seed, and the calyx-tube becoming pulpy and berry-like in fruit, strictly enclosing the achene.

1. **Elæagnus.** Flowers perfect. Stamens 4. Leaves alternate.
2. **Shepherdia.** Flowers diœcious. Stamens 8. Leaves opposite.

### 1. ELÆÁGNUS, Tourn.

Flowers perfect. Calyx cylindric-campanulate above the persistent oblong or globose base, the limb valvately 4-cleft, deciduous. Stamens 4, in the throat. Style linear, stigmatic on one side. Fruit drupe-like, with an oblong, 8-striate stone. — Leaves alternate, entire and petioled, and flowers axillary and pedicellate. (From *ἐλαία, the olive,* and *ἅγνος, sacred,* the Greek name of the Chaste-tree, *Vitex Agnus-castus.*)

1. **E. argéntea,** Pursh. (Silver-Berry.) A stoloniferous unarmed shrub (6 – 12° high), the younger branches covered with ferruginous scales; leaves elliptic to lanceolate, undulate, silvery-scurfy and more or less ferruginous; flowers numerous, deflexed, silvery without, pale yellow within, fragrant; fruit scurfy, round-ovoid, dry and mealy, edible, 4 – 5″ long. — N. W. Minn. to Utah and Montana.

### 2. SHEPHÉRDIA, Nutt.

Flowers diœcious; the sterile with a 4-parted calyx (valvate in the bud) and 8 stamens, alternating with as many processes of the thick disk; the fertile with an urn-shaped 4-cleft calyx, enclosing the ovary (the orifice closed by the teeth of the disk), and becoming berry-like in fruit. Style slender; stigma 1-sided. — Leaves opposite, entire, deciduous; the small flowers nearly sessile in their axils on the branches, clustered, or the fertile solitary. (Named for *John Shepherd,* formerly curator of the Liverpool Botanic Garden.)

1. **S. Canadénsis,** Nutt. Leaves elliptical or ovate, nearly naked and green above, silvery-downy and scurfy with rusty scales beneath; fruit yellowish-red, insipid. — Rocky or gravelly banks, Vt. and N. Y. to Mich., Minn., and north and westward. May. — Shrub 3 – 6° high, the branchlets, young leaves, yellowish flowers, etc., covered with rusty scales.

2. **S. argéntea,** Nutt. (Buffalo-Berry.) Somewhat thorny, 5 – 18° high; leaves cuneate-oblong, silvery on both sides; fruit ovoid, scarlet, acid and edible. — N. Minn. to Col., and westward.

## Order 96. LORANTHÀCEÆ. (Mistletoe Family.)

*Shrubby plants with coriaceous greenish foliage, parasitic on trees,* represented in the northern temperate zone chiefly by the Mistletoe and its near allies; distinguished from the next family more by the parasitic growth and habit, and by the more reduced flowers, than by essential characters.

1. **Phoradendron.** Anthers 2-celled. Berry globose, pulpy. Leaves foliaceous.
2. **Arceuthobium.** Anthers a single orbicular cell. Berry compressed, fleshy. Leaves scale-like, connate.

### 1. PHORADÉNDRON, Nutt. False Mistletoe.

Flowers diœcious, in short catkin-like jointed spikes, usually several to each short fleshy bract or scale, and sunk in the joint. Calyx globular, 3- (rarely 2 – 4-) lobed; in the staminate flowers a sessile anther is borne on the base of each lobe, transversely 2-celled, each cell opening by a pore or slit; in the fertile flowers the calyx-tube adheres to the ovary; stigma sessile, obtuse. Berry 1-seeded, pulpy. Embryo small, half imbedded in the summit of mucilaginous albumen. — Yellowish-green woody parasites on the branches of trees, with jointed much-branched stems, thick and firm persistent leaves (or only scales in their place), and axillary small spikes of flowers. (Name composed of *φώρ, a thief,* and *δένδρον, tree;* from the parasitic habit.)

1. **P. flavéscens,** Nutt. (American Mistletoe.) Leaves obovate or oval, somewhat petioled, longer than the spikes, yellowish; berries white. — On various deciduous trees, N. J. to S. Ind., Mo., and southward.

### 2. ARCEUTHÒBIUM, Bieb.

Flowers axillary or terminal, solitary or several from the same axil. Calyx mostly compressed; the staminate usually 3-parted, the pistillate 2-toothed. Anthers a single orbicular cell, opening by a circular slit. Berry compressed, fleshy, on a short recurved pedicel. — Parasitic on Conifers, glabrous, with rectangular branches and connate scale-like leaves; flowers often crowded in apparent spikes or panicles, opening in summer or autumn and maturing fruit the next autumn (From ἄρκευθος, *the juniper*, and βίος, *life*.)

1. **A. pusíllum,** Peck. Very dwarf, the slender scattered or clustered stems 3 – 10″ high, usually simple, olive-green to chestnut; scales obtuse; flowers solitary in most of the axils; fruit narrowly oblong, 1″ long. — On *Abies nigra*; N. New York; Hanover, N. H. (*Jesup*).; Pocono Mt., Penn.

## Order 97. SANTALÀCEÆ. (Sandalwood Family.)

*Herbs, shrubs, or trees, with entire leaves; the* 4 – 5-*cleft calyx valvate in the bud, its tube coherent with the* 1-*celled ovary, which contains* 2 – 4 *ovules suspended from the apex of a stalk-like free central placenta which rises from the base of the cell, but the* (*indehiscent*) *fruit always* 1-*seeded.* — Seed destitute of any proper seed-coat. Embryo small, at the apex of copious albumen; radicle directed upward; cotyledons cylindrical. Stamens equal in number to the lobes of the calyx, and inserted opposite them into the edge of the fleshy disk at their base. Style 1. A small order, the greater part belonging to warm regions.

1. **Comandra.** Flowers perfect, in umbel-like clusters. Low herbaceous perennials.
2. **Pyrularia.** Flowers diœcious or polygamous, in short spikes or racemes. Shrub.

### 1. COMÁNDRA, Nutt. Bastard Toad-flax.

Flowers perfect. Calyx bell-shaped or soon urn-shaped, lined above the ovary with an adherent disk which has a 5-lobed free border. Stamens inserted on the edge of the disk between its lobes, opposite the lobes of the calyx, to the middle of which the anthers are connected by a tuft of thread-like hairs. Fruit drupe-like or nut-like, crowned by the persistent calyx-lobes, the cavity filled by the globular seed. — Low and smooth (sometimes parasitic) perennials, with herbaceous stems from a rather woody base or root, alternate and almost sessile leaves, and greenish-white flowers in terminal or axillary small umbel-like clusters. (Name from κόμη, *hair*, and ἄνδρες, for *stamens*, in allusion to the hairs on the calyx-lobes which are attached to the anthers.)

1. **C. umbellàta,** Nutt. Stem 8 – 10′ high, branched, very leafy; leaves oblong, pale (1′ long); *peduncles* several and *corymbose-clustered at the summit, several-flowered;* calyx-tube conspicuously continued as a neck to the dry *globular-urn-shaped fruit; the lobes oblong; style slender.* — Dry ground, common. May, June. Root forming parasitic attachments to the roots of trees.

2. **C. pállida,** A. DC. *Leaves narrower, more glaucous and acuter, linear to narrowly lanceolate* (or those upon the main stem oblong), all acute or some-

what cuspidate; *fruit ovoid, larger* (3–4″ long), sessile or on short stout pedicels. — W. Minn. to S. W. Kan., and westward.

3. **C. lívida,** Richardson. *Peduncles* slender, *axillary, 3–5-flowered,* shorter than the oval leaves; calyx-tube not continued beyond the ovary, *the lobes ovate; style short;* fruit pulpy when ripe, red. — Newf., N. Vt., sandy shores of L. Superior, and northward.

## 2. PYRULÀRIA, Michx. OIL-NUT. BUFFALO-NUT.

Flowers diœcious or polygamous. Calyx 4–5-cleft, the lobes recurved, hairy-tufted at base in the male flowers. Stamens 4 or 5, on very short filaments, alternate with as many rounded glands. Fertile flowers with a pear-shaped ovary invested by the adherent tube of the calyx, naked at the flat summit; disk with 5 glands; style short and thick; stigma capitate-flattened. Fruit fleshy and drupe-like, pear shaped; the globose endocarp thin. Embryo small; albumen very oily. — Shrubs or trees, with alternate short-petioled and deciduous leaves; the small greenish flowers in short and simple spikes or racemes. (Name a diminutive of *Pyrus*, from the shape of the fruit.)

1. **P. pùbera,** Michx. Shrub straggling (3–12° high), minutely downy when young, at length nearly glabrous; leaves obovate-oblong, acute or pointed at both ends, soft, very veiny, minutely pellucid-punctate; spike small and few-flowered, terminal; calyx 5-cleft; fruit 1′ long. (P. oleifera, *Gray.*) — Rich woods, mountains of Penn. to Ga. Whole plant, especially the fruit, imbued with an acrid oil.

## ORDER 98. EUPHORBIÀCEÆ. (SPURGE FAMILY.)

*Plants usually with a milky acrid juice, and monœcious or diœcious flowers, mostly apetalous, sometimes achlamydeous (occasionally polypetalous or monopetalous); the ovary free and usually 3-celled, with a single or sometimes a pair of ovules hanging from the summit of each cell; stigmas or branches of the style as many or twice as many as the cells; fruit commonly a 3-lobed capsule, the lobes or carpels separating elastically from a persistent axis and elastically 2-valved; seed anatropous; embryo straight, almost as long as and the flat cotyledons mostly as wide as the fleshy or oily albumen.* Stipules often present. — A vast family in the warmer parts of the world; most numerously represented in northern countries by the genus Euphorbia, which has very reduced flowers within a calyx-like involucre.

* Flowers all without calyx, included in a cup-shaped calyx-like involucre, — the whole liable to be mistaken for a single flower.

1. **Euphorbia.** Involucre surrounding many staminate flowers (each of a single naked stamen) and one pistillate flower (a 3-lobed pistil).

* * Flowers with a calyx, without involucre.

+ Seeds and ovules 2 in each cell; flowers monœcious.

2. **Pachysandra.** Flowers in basal spikes. Calyx 4-parted. Stamens 4, distinct.
3. **Phyllanthus.** Flowers axillary. Stamens 3, united.

+ + Seeds and ovules 1 in each cell.

*a.* Flowers apetalous, in cymose panicles (2–3-chotomous); stamens 10, erect in the bud.

4. **Jatropha.** Calyx corolla-like, the staminate salver-form; armed with stinging hairs.

*b.* Flowers in terminal racemes or spikes. Stamens inflexed in the bud. Stellate-downy or scurfy, or hairy and glandular; leaves mostly entire.

5. **Croton.** Flowers spiked or glomerate. Ovary and fruit 3- (rarely 2-4-) celled.
6. **Crotonopsis.** Flowers scattered on the branchlets. Ovary and fruit 1-celled.

*c.* Flowers in axillary spikes or racemes (except n. 9), apetalous (except n. 7). Stamens 8 or more; anthers erect in the bud.

7. **Argythamnia.** Petals and sepals 5. Stamens 10-15, united. Styles bifid, linear.
8. **Acalypha.** Calyx 4- (3-5-) parted. Stamens mostly 8. Fertile flowers in the axils of leafy bracts. Stigmas finely dissected.
9. **Ricinus.** Racemes terminal, subpanicled. Calyx 3-5-parted. Stamens very numerous; the filaments repeatedly branched. Styles 2-parted.

*d.* Flowers apetalous, in racemes or spikes pistillate at base. Stamens 2 or 3. Styles simple.

10. **Tragia.** Flowers racemose. Calyx-lobes valvate in bud. Hirsute or pubescent.
11. **Stillingia.** Flowers spicate. Calyx-lobes imbricate in bud. Fertile bracts glanduliferous. Glabrous.

## 1. EUPHÓRBIA, L. Spurge.

Flowers monœcious, included in a cup-shaped 4-5-lobed involucre (*flower* of older authors) resembling a calyx or corolla, and usually bearing large thick glands (with or without petal-like margins) at its sinuses. Sterile flowers numerous and lining the base of the involucre, each from the axil of a little bract, and consisting merely of a single stamen jointed on a pedicel like the filament; anther-cells globular, separate. Fertile flower solitary in the middle of the involucre, soon protruded on a long pedicel, consisting of a 3-lobed and 3-celled ovary with no calyx, or a mere vestige. Styles 3, each 2-cleft; the stigmas therefore 6. Pod separating into 3 1-seeded carpels, which split elastically into 2 valves. Seed often caruncled (ours only in §§ 5 and 6). — Plants (herbs in the United States), with a milky acrid juice. Peduncles terminal, often umbellate-clustered; in the first section mostly appearing lateral, but not really axillary. (Named after *Euphorbus*, physician to King Juba.)

A. *Glands of the involucre with petal-like, usually white or rose-colored, margins or appendages; these almost obsolete in* n. 1.

§ 1. ANISOPHÝLLUM. *Leaves all opposite, short-petioled, small, oblique at base; stipules awl-shaped or scaly and often fringed, persistent; stems much branched, spreading or usually procumbent; involucres solitary in the forks or in terminal or pseudo-lateral clusters, small, with* 4 *glands; seeds ash-colored (except in* n. 10); *annuals.*

* *Seeds smooth and even; leaves entire; whole plant glabrous.*

1. **E. polygonifòlia,** L. Prostrate-spreading; *leaves oblong-linear,* obtuse, mucronate, slightly cordate or obtuse at base (4-8″ long); stipules setaceously divided; peduncles in the forks, as long as the petioles; lobes of the involucre longer than the *minute not appendaged glands;* pods obtusely angled; seeds ovate (over 1″ long, the largest of this section). — Sandy shores of the Atlantic and of the Great Lakes.

2. **E. Géyeri,** Engelm. Procumbent; *leaves oblong-ovate,* obtuse, slightly mucronate, mostly acutish at base, lowermost cordate (3-6″ long); stipules setaceously divided; peduncles as long as the petioles, at length in loose foliaceous lateral clusters; glands with *narrow white or red appendages;* pods

acutely angled; seeds ovate, acute at one end (½″ long). — Sandy soil, Ill. to Wisc., Minn., and Kan.

3. **E. petaloìdea,** Engelm. Resembling the last, but half-erect and spreading; *leaves longer, narrower, retuse or emarginate;* peduncles longer than the petioles; involucres larger, *the broadly campanulate appendages much larger and conspicuous;* pod obtusely angled; seeds nearly 1″ long. — From Iowa and Mo., westward.

4. **E. sérpens,** HBK. Stems filiform, prostrate, and often rooting; *leaves round-ovate,* obtuse or cordate at base (only ½ – 1½″ long); *stipules membranaceous, triangular;* peduncles much longer than the petioles, at length in loose foliaceous lateral clusters; glands of the very small involucre with *minute crenulate appendages;* pods acutely angled; seeds obtusely angled (½″ long or less). — Rich soil, Ill. and Iowa to Kan., and southward. Rarely adv. eastward.

* * *Seeds minutely roughened or transversely wrinkled or pitted; leaves more or less serrulate, smooth or often hairy.*

5. **E. serpyllifòlia,** Pers. Glabrous, prostrate-spreading; *leaves obovate-oblong,* narrowed at the very oblique base, sharply serrulate toward the obtuse apex (3 – 6″ long, often with a red spot); stipules lanceolate, fimbriate; peduncles as long as or longer than the petioles, at length in loose foliaceous lateral clusters; glands of the small involucre with narrow somewhat toothed appendages; pods sharply angled; *seeds acutely quadrangular, slightly cross-wrinkled,* often pitted (nearly ¾″ long). — Wisc. to Mo., and westward.

6. **E. glyptospérma,** Engelm. Glabrous (or very rarely puberulent), erect-spreading; *leaves linear-oblong,* mostly falcate, very unequal at base, slightly serrulate toward the obtuse apex (2 – 5″ long); stipules lanceolate, setaceously divided; peduncles as long as the petioles, in dense foliaceous lateral clusters; glands of the very small involucre with narrow crenulate appendages; pods sharply angled; *seeds sharply 4-angled and with 5 or 6 sharp transverse wrinkles* (½″ long). — Ont. to Wisc., Ill., Mo., and westward.

7. **E. maculàta,** L. Prostrate; stems puberulent or hairy; *leaves oblong-linear,* very oblique at base, serrulate upward, more or less pubescent or sometimes smoothish (4 – 6″ long), usually with a brown-red spot in the centre; stipules lanceolate, fimbriate; peduncles as long as the petioles, in dense foliaceous lateral clusters; glands of the small involucre minute, with narrow slightly crenate (usually red) appendages; pods acutely angled, puberulent; *seeds ovate* (⅗″ long), *sharply 4-angled and with about 4 shallow grooves across the concave sides.* — Open places, roadsides, etc., common.

8. **E. humistràta,** Engelm. Procumbent, puberulent or hairy; *leaves elliptical or obovate,* very oblique at base, serrulate toward the apex, sparsely hairy underneath (4 – 9″ long, sometimes with a brown spot above); stipules lanceolate, fimbriate; peduncles rather shorter than the petioles, in dense scarcely foliaceous lateral clusters; *involucre cleft on the back,* its (red or white) appendages truncate or crenate; pods sharply angled, puberulent; *seeds ovate, obtusely angled, minutely roughened* (½″ long). — Rich soil, Ind. and W. Tenn. to Minn. and Kan.

9. **E. Préslii,** Guss. Smooth or with scattered hairs, ascending or erect (1 – 2° high); leaves oblique at the obtuse or slightly cordate base, ovate-oblong or oblong-linear, sometimes falcate, serrate (½ – 1½′ long), often with a

red spot or red margins; stipules triangular; peduncles longer than the petioles, collected in loose leafy terminal cymes; *appendages entire*, larger and white, or smaller and sometimes red; *pod glabrous, obtusely angled; seeds ovate, obtusely angled, wrinkled and tubercled* (½″ long), blackish. (E. hypericifolia of *Man.*, not *L.*) — Common throughout the U. S. east of the plains.

§ 2. ZYGOPHYLLÍDIUM. *Leaves opposite, on short petioles, not oblique, with stipular glands; stems dichotomously branched, erect; cymes terminal; involucres with* 5 *glands; seeds tuberculate.*

10. **E. hexágona,** Nutt. Somewhat hairy (1° high or more); branches striate-angled; leaves linear-lanceolate, entire; involucre hairy without and within; glands with green ovate-triangular appendages twice their length; capsule smooth; seeds ovate. — Iowa to Tex., west to Col. and Montana.

§ 3. PETALÒMA. *Uppermost leaves with conspicuous white petal-like margins, whorled or opposite, the others scattered; erect annuals, with leaves equal at base and entire, and with lanceolate deciduous stipules; involucres* 5-*lobed, in an umbel-like inflorescence.*

11. **E. marginàta,** Pursh. Stem stout (2 – 3° high), erect, hairy; leaves sessile, ovate or oblong, acute; umbel with 3 dichotomous rays; glands of the involucre with broad white appendages. — Minn. to Mo., west to Col., also spreading eastward to Ohio, and frequently escaped from gardens, where it is often cultivated for its showy broadly white-margined floral leaves.

§ 4. TITHYMALÓPSIS. *Only the uppermost leaves whorled or opposite; erect perennials, with entire leaves equal at base; stipules none; involucres mostly* 5-*lobed, in the forks of the branches and terminal; inflorescence umbelliform.*

12. **E. corollàta,** L. Glabrous or sometimes sparingly hairy (2 – 3° high); leaves ovate, lanceolate, or linear, entire, obtuse; umbel 5- (3 – 7-) forked, and the forks again 2 – 3- (or rarely 5-) forked; involucres long-peduncled, with showy white appendages (appearing like petals), the lobes minute and incurved; pod slender-pedicelled, smooth; seeds thick (1″ long or more), ash-colored, slightly uneven. — Rich or sandy soil, N. Y. and N. J. to Fla., west to Minn. and La., also adventive in Mass. July – Oct.

**B.** *Glands of the involucre without petaloid appendages.*

§ 5. POINSÉTTIA. *Involucres in terminal clusters,* 4 – 5-*lobed, with few (or often solitary) cup-shaped glands; erect annuals, with variable, entire, dentate, or sinuate leaves, all or only the upper ones opposite; the uppermost often colored, especially at base; stipules small and glandular.*

13. **E. dentàta,** Michx. Erect or ascending, hairy (1° high); leaves ovate, lanceolate, or linear, petioled, coarsely toothed (1 – 2′ long), *only the lowest alternate,* the upper often paler at base; involucres almost sessile, with 5 oblong dentate lobes, and one or sometimes more *short-stalked glands;* seeds ovate-globular, slightly tubercled. — Rich soil, Penn. to Tenn., Iowa, E. Kan., and southward. July – Sept.

14. **E. heterophýlla,** L. Erect (1 – 3° high), glabrous; *leaves alternate,* petioled, ovate-fiddle-shaped and sinuate-toothed, or lanceolate or linear and entire, often only those of the branches linear; the upper usually with a

red base; involucres about the length of the peduncle, with 5 ovate incised lobes and a single or few and *almost sessile glands;* seeds nearly globular, tubercled. — Slopes and rocky soil, Minn. to W. Ill., Iowa and Mo.

§ 6. TITHÝMALUS. *Involucres in a terminal dichotomous or commonly umbelliform inflorescence, 5- or usually 4-lobed, with as many flat or convex entire or crescent-shaped glands; seeds carunculate* (*except* n. 15); *ours ascending or erect, and mostly glabrous, without stipules.*

* *Perennials with entire leaves, all or only the upper opposite; involucres long-peduncled in a dichotomous inflorescence, mostly with 5 transversely oblong glands; seeds without caruncle.*

15. **E. Ipecacuánhæ,** L. Stems many from a very long perpendicular root, erect or diffusely spreading (5 – 10′ long), forking from near the base: leaves varying from obovate or oblong to narrowly linear, almost sessile, glabrous; peduncles elongated (½ – 1′ long); pod long-pedicelled, obtusely angled, nearly smooth; seed ovate, white, sparsely marked with impressed dots. — Sandy soil, near the coast; Conn. to Fla.; also barrens of S. Ind.

* * *Leaves scattered, only the floral in the umbelliform inflorescence whorled or opposite and of a different shape; glands mostly* 4.

+ *Leaves serrulate or rarely entire; glands transversely oval, obtuse.*

++ *Seeds smooth and even; pod warty or rough.*

16. **E. Darlingtònii,** Gray. Tall *perennial* (2 – 4° high); *leaves entire, minutely downy beneath;* those of the stem lanceolate-oblong from a narrow base; the floral oval, very obtuse; the upper roundish-dilated with a truncate base; umbel 5 – 8-rayed, then simply forked; *pod minutely warty;* large globular seed with a small caruncle. — Copses, N. Y. and Penn., to the mountains of N. C. July – Sept.

17. **E. obtusàta,** Pursh. Erect *annual* (1 – 2° high); *leaves oblong-spatulate,* minutely serrulate, *smooth, all obtuse;* upper ones cordate at base; floral ones ovate, dilated, barely mucronate; umbel once or twice divided into 3 rays, then into 2; *involucre with naked lobes* and small stipitate glands; *styles distinct,* longer than the ovary, erect, 2-*cleft to the middle;* pod beset with long warts. — Damp woods, Va. to S. C., west to Iowa and Kan. May – July.

**E.** PLATYPHÝLLA, L. Erect *annual* (8 – 18′ high); upper *stem-leaves lanceolate-oblong, acute,* cordate at base, minutely serrulate, mostly *with scattered hairs beneath;* floral ones triangular-ovate, subcordate; umbel 5-rayed; *involucre with ciliate lobes* and large sessile glands; *styles* longer than the ovary, *united at base, slightly 2-cleft;* pod covered with depressed warts. — Along the St. Lawrence and Great Lakes to Mich. June – Aug. (Adv. from Eu.)

++ ++ *Seeds rugose or reticulated; leaves serrulate; annuals.*

18. **E. dictyospérma,** Fischer & Meyer. Stem erect (8 – 18′ high); *leaves* oblong- or obovate-spatulate, smooth, all obtuse and *obtusely serrate;* upper ones cordate at base; floral ones roundish-ovate or obscurely heart-shaped, slightly mucronate; umbels once or twice 3-forked, then 2-forked; involucre with nearly naked lobes and *small almost sessile glands;* styles shorter than the ovary, spreading or recurved; *pod warty; seeds delicately reticulated.* — Prairies and roadsides, Md. to Minn., Ala., and westward May – July.

**E.** Helioscòpia, L. Stems ascending (6–12′ high), stout; *leaves all obovate* and very rounded or retuse at the end, *finely serrate*, smooth or a little hairy, those of the stem wedge-shaped; umbel divided into 5 rays, then into 3, or at length simply forked; *glands orbicular, stalked; pods smooth and even; seeds with coarse honeycomb-like reticulations.* — Waste places, eastward and along the Great Lakes to Mich. July–Sept. (Nat. from Eu.)

+ + *Leaves entire; glands crescent-shaped or 2-horned.*

++ *Seeds smooth and dark-colored; perennials, with running rootstocks.*

**E.** Ésula, L. Stems clustered (1° high); *leaves lanceolate or linear, the floral* (yellowish) *broadly heart-shaped*, mucronate; umbel divided into many rays, then forking; *glands short-horned* (brown); pods smoothish and granular. — Mass., western N. Y., and Mich.; rare. (Adv. from Eu.)

**E.** Cyparíssias, L. Stems densely clustered (6–10′ high); *stem-leaves linear, crowded, the floral heart-shaped;* umbel many-rayed; *glands crescent-shaped;* pods granular. — Escaped from gardens, common. (Nat. from Eu.)

**E.** Nicæénsis, All. *Stout and tall* glabrous perennial; *leaves oblong or oblong-lanceolate*, the floral broadly heart-shaped, mucronate; terminal umbel many-rayed, the rays forking; glands short-horned; *pods finely wrinkled.* — A rare escape; Binghampton, N. Y. (Adv. from Eu.)

++ ++ *Seeds sculptured, ash-colored; pod smooth; annuals or biennials.*

**E.** Péplus, L. Erect or ascending (5–10′ high); *leaves petioled*, thin, round-obovate, the upper floral ones ovate; umbel 3-rayed, then forking; glands long-horned; lobes of the *pod 2-wing-crested* on the back; *seeds 2-grooved on the inner face, pitted on the back* (scarcely over ½″ long). — Waste places, N. Eng. to N. J. and western N. Y. (Adv. from Eu.)

19. **E. commutàta,** Engelm. Stems branched from a commonly decumbent base (6–12′ high); *leaves* obovate, obtuse; the upper all *sessile*, the upper floral ones roundish-dilated, broader than long; umbel 3-forked; glands with slender horns; *capsule obtusely angled; seeds ovate, pitted all over* (1″ long). — Along streams and shady slopes, Md. to Fla., Minn., and Mo.

* * * *Glabrous annual or biennial with entire opposite and decussate leaves, an umbelliform inflorescence, and short-horned glands.*

**E.** Láthyris, L. Stem stout (2–3° high); leaves thick, linear or oblong, the floral oblong-ovate and heart-shaped; umbel 4-rayed, then forking. — Sparingly escaped from gardens, N. Eng. to N. C. (Adv. from Eu.)

## 2. PACHYSÁNDRA, Michx.

Flowers monœcious, in naked spikes. Calyx 4–5-parted. Petals none. *Ster. Fl.* Stamens 4, separate; filaments long-exserted, thick and flat; anthers oblong-linear. *Fert. Fl.* Ovary 3-celled; styles 3, thick, awl-shaped, recurved, stigmatic down their whole length inside. Ovules a pair in each cell, suspended, with the rhaphe dorsal (turned away from the placenta). Capsule deeply 3-horned, 3-celled, splitting into 3 at length 2-valved 2-seeded carpels. — Nearly glabrous, low and procumbent perennial herbs, with matted creeping rootstocks, and alternate, ovate or obovate, coarsely toothed leaves, narrowed at base into a petiole. Flowers each 1–3-bracted, the upper staminate, a few fertile ones at base, unpleasantly scented; sepals greenish or purplish; filaments white (their size and thickness giving the name, from *παχύς*, *thick*, and *ἀνήρ*, used for *stamen*).

1. **P. procúmbens,** Michx. Stems (6–9′ long) bearing several approximate leaves at the summit on slender petioles, and a few many-flowered

spikes along the base; the intervening portion naked, or with a few small scales. — Woods, mountains of Ky., W. Va., and southward. March – May.

## 3. PHYLLÁNTHUS, L.

Flowers monœcious, axillary. Calyx usually 5 – 6-parted, imbricated in the bud. Petals none. Stamens mostly 3, erect in the bud, often united. Ovules 2 in each cell of the ovary. Capsule depressed; each carpel 2-valved, 2-seeded. Seeds not carunculate. — Leaves alternate, 2-ranked, with small stipules. (Name composed of *φύλλον, leaf*, and *ἄνθος, blossom*, because the flowers in a few species are borne upon leaf-like dilated branches.)

1. **P. Carolinénsis,** Walt. Annual, low and slender, branched; leaves obovate or oval, short-petioled; flowers commonly 2 in each axil, almost sessile, one staminate, the other fertile; calyx 6-parted; stamens 3; styles 3, each 2-cleft; glands of the disk in the fertile flowers united in a cup. — Gravelly banks, E. Penn. to Fla., west to S. Ind. and Ill. July – Sept.

## 4. JÁTROPHA, L.

Flowers monœcious, rarely diœcious, in a terminal open forking cyme; the fertile ones usually in the lower forks. Calyx corolla-like, in the staminate flowers often salver-shaped, 5-lobed; in the pistillate, 5-parted, imbricated or convolute in the bud. Corolla of 5 distinct or apparently united petals, or none. Glands of the disk opposite the calyx-lobes. Stamens 10 – 30, in 2 or more whorls; filaments monadelphous at base. Ovary mostly 3-celled; styles 3, united below, their summits once or twice forked. Capsule 3-celled, 3-seeded, separating into 3 two-valved carpels. Seed carunculate. — Perennial herbaceous or shrubby plants, chiefly tropical, with alternate mostly long-petioled palmately-veined leaves, and stipules. — Our species is of the section Cnidóscolus, with apetalous flowers, the staminate corolla salverform, and the plants mostly armed with stinging bristles. (Name said by Linnæus to be formed of *ἰατρὸν, a remedy*, and *φάγω, to eat*.)

1. **J. stimulòsa,** Michx. (Tread-softly. Spurge-Nettle.) Herbaceous, from a long perennial root, branching (6′ – 2° high); leaves roundish-heart-shaped, 3 – 5-lobed nearly to the base, on long petioles; the divisions entire or acutely toothed, cut, or even pinnatifid, often discolored; flowers white, fragrant, 9″ long or more; filaments 10, monadelphous only at the woolly base, or the outer set almost distinct. (J. urens, var. stimulosa, *J. Muell.*) — Dry sandy soil, Va. to Fla. and La. June – Sept.

## 5. CRÒTON, L.

Flowers monœcious, rarely diœcious, mostly in terminal spike-like racemes or spikes. *Ster. Fl.* Calyx 5- (rarely 4 – 6-) parted; the divisions lightly imbricated or nearly valvate in the bud. Petals usually present, as many, but mostly small or rudimentary, hypogynous. Glands or lobes of the disk as many as and alternate with the petals. Receptacle usually hairy. Stamens 5 or more; filaments with the anthers inflexed in the bud. *Fert. Fl.* Calyx 5 – 10-cleft or parted, nearly as in the staminate flowers; but petals none or minute rudiments. Ovary 3- (rarely 2 – 4-) celled, with a single ovule in each cell; styles as many, from once to thrice 2-cleft. Capsule separating into as many 2-valved 1-seeded carpels. Seeds carunculate. — Stellate-downy, or scurfy, or hairy and glandular plants, mostly strong-scented; the fertile flowers usually at the base of the sterile spike or cluster. Leaves alternate, or sometimes imperfectly opposite, with or without obvious stipules. (Κροτών, the Greek name of the Castor-oil Plant, of this family.)

* *Sterile flowers with 4-parted calyx, as many petals, a 4-rayed disk, and 8 stamens; fertile flowers with 5-parted calyx, very minute rudimentary petals, and the 3 styles 2-cleft.*

1. **C. glandulòsus,** L. Annual, rough-hairy and glandular (1 – 2° high), somewhat umbellately branched; leaves oblong or linear-oblong, obtusely toothed, the base with a saucer-shaped gland on each side; fertile flowers capitate-clustered at the base of the sterile spike, sessile in the forks and terminal. — Open waste places, Va. to Iowa, E. Kan. and southward.

* * *Sterile flowers with 5-parted calyx, as many glands alternating with the petals, and 10 – 14 stamens; fertile flowers with 7 – 12-parted calyx, no petals, and the 3 styles twice or thrice 2-parted.*

2. **C. capitàtus,** Michx. Annual, densely soft-woolly and somewhat glandular (1 – 2° high), branched; leaves long-petioled, lance-oblong or elongated-oblong, rounded at base, entire; petals obovate-lanceolate, densely fimbriate; fertile flowers several, capitate-crowded at the base of the short terminal sterile spike. — Barrens, N. J. to Ga., west to S. Ind., Iowa, and E. Kan. July – Sept.

* * * *Sterile flowers with unequally 3 – 5-parted calyx, as many petals and scale-like glands, and 3 – 8 stamens: fertile flowers with equally 5-parted calyx, no petals, 5 glands, and 2 sessile 2-parted stigmas.*

3. **C. monanthógynus,** Michx. Annual, whitish-stellate-pubescent and rusty-glandular; stems (1 – 2° high) slender, erect, below often umbellately 3 – 4-forked, then repeatedly 2 – 3-forked or alternately branched; leaves oblong-ovate or narrowly oblong, entire, often acutish (6 – 12″ long, about twice the length of the petioles); flowers in the forks, the sterile few on the summit of a short and erect peduncle, the fertile few and clustered or mostly solitary on short recurved peduncles; ovary 2-celled; fruit often by abortion 1-celled and 1-seeded; the seed broadly oval. — Barrens and dry prairies, S. Ind. to N. C. and Fla., west to E. Kan. June – Sept.

* * * * *Diœcious; calyx equally 5-parted; petals none; stamens 10 or more; styles twice or thrice dichotomously 2-parted.*

4. **C. Texénsis,** Muell. Annual, covered with a close canescent stellate pubescence, dichotomously branched or spreading (1 – 2° high); leaves narrowly oblong-lanceolate to linear; staminate spikes or racemes very short, often sessile; capsule stellate-tomentose and somewhat muricate. — Mo. and Kan. to Ala., Tex., and westward.

## 6. CROTONÓPSIS, Michx.

Flowers monœcious, in very small terminal or lateral spikes or clusters, the lower fertile. *Ster. Fl.* Calyx equally 5-parted. Petals 5, spatulate. Stamens 5, opposite the petals; filaments distinct, inflexed in the bud, enlarged at the apex. *Fert. Fl.* Calyx unequally 3 – 5-parted. Petals none. Glands (petal-like scales) 5, opposite the sepals. Ovary 1-celled, simple, 1-ovuled, bearing a twice or thrice forked style. Fruit dry and indehiscent, small, 1-seeded. Seed without caruncle. — A slender low annual, with alternate or opposite short-petioled linear or elliptical-lanceolate leaves, which are green and smoothish above, but silvery hoary with starry hairs and scurfy with brownish scales underneath, as well as the branches, etc. (*Croton* and *ὄψις, appearance*, for a plant with the aspect and general character of Croton.)

1. **C. lineàris,** Michx. — Dry sandy soil, N. J. to Fla., west to Ill. and Kan. July – Sept. — Fruit about 1″ long.

## 7. ARGYTHÁMNIA, P. Browne.

Flowers monœcious. Calyx 5-parted, valvate in the staminate flowers, imbricate in the pistillate. Petals alternate with the calyx-lobes and with the prominent lobes of the glandular disk. Stamens 5 – 15, united into a central column in 1 – 3 whorls. Styles 1 – 3-cleft. Capsule depressed, 3-lobed. Seeds subglobose, roughened or reticulated, not carunculate. — Erect herbs or undershrubs, with purplish juice, and alternate usually stipulate leaves. (Name from *ἄργυρος, silver*, and *θάμνος, bush*, from the hoariness of the original species.)

1. **A. mercurialina,** Muell. Stem erect, nearly simple (1 – 2° high), sericeous; leaves sessile, oblong-ovate to lanceolate, entire, pubescent with appressed hairs or glabrate, somewhat rigid; raceme many-flowered, exceeding the leaves; ovary sericeous; capsule appressed-pubescent. — Kan. to Ark. and Tex.

## 8. ACALỲPHA, L. Three-seeded Mercury.

Flowers monœcious; the sterile very small, clustered in spikes, with the few or solitary fertile flowers at their base, or sometimes in separate spikes. Calyx of the sterile flowers 4-parted and valvate in bud; of the fertile, 3 – 5-parted. Corolla none. Stamens 8 – 16; filaments short, monadelphous at base; anther-cells separate, long, often worm-shaped, hanging from the apex of the filament. Styles 3, the upper face or stigmas cut-fringed (usually red). Capsule separating into 3 globular 2-valved carpels, rarely of only one carpel. — Herbs (ours annuals), or in the tropics often shrubs, resembling Nettles or Amaranths; the leaves alternate, petioled, with stipules. Clusters of sterile flowers with a minute bract; the fertile surrounded by a large and leaf-like cut-lobed persistent bract. (Ἀκαλήφη, an ancient name of the Nettle.)

* *Fruit smooth or merely pubescent; seeds nearly smooth.*

1. **A. Virgínica,** L. Smoothish or hairy (1 – 2° high), often turning purple; leaves ovate or oblong-ovate, obtusely and sparsely serrate, long-petioled; sterile spike rather few-flowered, mostly shorter than the large leaf-like palmately 5 - 9-cleft fruiting bracts; fertile flowers 1 – 3 in each axil. — Fields and open places, N. Eng. to Ont. and Minn., south to the Gulf. July – Sept.

Var. **grácilens,** Muell. Leaves lanceolate or even linear, less toothed and shorter-petioled; the slender sterile spike often 1′ long, and much surpassing the less cleft or few-toothed fruiting bracts. — Sandy dry soil, R. I. and Conn. to Fla., west to Ill., E. Kan. and Tex.

* * *Fruit echinate with soft bristly green projections; seeds rough-wrinkled.*

2. **A. Caroliniàna,** Ell. Leaves thin, ovate-cordate, sharply and closely serrate-toothed, abruptly acuminate, long-petioled; sterile spikes short, axillary; the fertile ones mostly terminal and elongated, their bracts deeply cut into many linear lobes. — N. J. to Fla., west to Ohio, Kan., and Tex

### 9. RÍCINUS, Linn. CASTOR-OIL PLANT.

Flowers in racemose or panicled clusters, the fertile above, the staminate below. Calyx 5-parted. Stamens very numerous, with repeatedly branching filaments. Styles 3, united at base, each bifid, red. Capsule large, 3-lobed, with 3 large seeds. — A tall stately annual, with very large alternate peltate and palmately 7 – 11-cleft leaves (often 1 – 2° broad). (The ancient Roman name of the plant.)

**R.** COMMÙNIS, L. — Cultivated extensively for ornament, and sparingly escaped in Md., Mo., and southward. Very variable.

### 10. TRÀGIA, Plumier.

Flowers monœcious, in racemes, apetalous. *Ster. Fl.* Calyx 3 – 5- (chiefly 3-) parted, valvate in the bud. Stamens 2 or 3; filaments short; anther-cells united. *Fert. Fl.* Calyx 3 – 8-parted, persistent. Style 3-cleft or 3-parted; the branches 3, simple. Capsule 3-celled, 3-lobed, bristly, separating into three 2-valved 1-seeded carpels. Seeds not carunculate. — Erect or climbing plants (perennial herbs in U. S.), pubescent or hispid, sometimes stinging, with mostly alternate stipulate leaves; the small-flowered racemes terminal or opposite the leaves; the sterile flowers above, the few fertile at the base, all with small bracts. (Named for the early herbalist *Bock*, latinized *Tragus.*)

1. **T. innócua,** Walt. *Erect,* paniculate-branched, *softly hairy-pubescent* (6 – 12′ high); *leaves* varying from obovate-oblong to narrowly linear, *acute at base,* obtusely or sinuately few-toothed or lobed, sometimes entire, *short-petioled or sessile,* paler beneath; sterile calyx usually 4-parted; stamens 2. (T. urens, *L.*) — Dry sandy soil, E. Va. to Fla. and La. May – Aug. — Not stinging.

2. **T. nepetæfòlia,** Cav. *Erect or reclining* or slightly twining, hirsute with stinging hairs; *leaves ovate-lanceolate or triangular-lanceolate,* or the lower ovate, *all somewhat cordate or truncate at base,* coarsely cut-toothed, *short-petioled;* sterile calyx usually 3-parted and stamens 3. (T. urticæfolia, *Michx.*) —Virginia (*Pursh*), and common southward to Fla. and Tex., Mo., Kan., and westward. — T. STYLÀRIS, Muell., of the southwest, which is reported from Kan., may be distinguished by its 4 – 5-parted sterile calyx, 4 – 5 stamens, and elongated styles.

3. **T. macrocárpa,** Willd. *Twining,* somewhat hirsute; *leaves deeply cordate,* ovate, mostly narrowly acuminate, sharply serrate (3 – 5′ long), all but the uppermost *long-petioled;* pod ½′ broad. (T. cordàta, *Michx.*) — Ky. to Ga., Fla., and La.

### 11. STILLÍNGIA, Garden.

Flowers monœcious, aggregated in a terminal spike. Petals and glands of the disk none. Calyx 2 – 3-cleft or parted; the divisions imbricated in the bud. Stamens 2 or 3; anthers adnate, turned outward. Style thick; stigmas 3, diverging, simple. Capsule 3-celled, 3-lobed, 3-seeded. Seed caruneulate. — Smooth upright plants, with the alternate leaves mostly 2-glandular at base; the fertile flowers few at the base of the dense sterile spike (rarely separate); the bract for each cluster with a large gland on each side. (Named for *Dr. B. Stillingfleet.*)

1. **S. sylvática,** L. Herbaceous (1 – 3° high); leaves almost sessile, oblong-lanceolate, serrulate; glands of the spike saucer-shaped. — Sandy and dry soil, Va. to Fla., west to Kan. and Tex. June – Sept.

## ORDER 99. URTICÀCEÆ. (NETTLE FAMILY.)

*Plants with stipules, and monœcious or diœcious or rarely (in the* Elm Family) *perfect flowers, furnished with a regular calyx, free from the* 1-*celled (rarely 2-celled) ovary which forms a* 1-*seeded fruit; the embryo in the albumen when there is any, its radicle pointing upward; stamens as many as the lobes of the calyx and opposite them, or sometimes fewer.* Cotyledons usually broad. Stipules often deciduous. — A large order (far the greater part tropical).

**Tribe I. ULMEÆ.** Flowers mostly polygamous, upon the last year's branches. Anthers erect in the bud, extrorse. Styles or stigmas 2. Fruit a winged samara or nut-like. Seed suspended. Embryo straight. — Trees, with alternate serrate pinnately veined leaves and fugacious stipules.

1. **Ulmus.** Flowers preceding the leaves Ovary 1 – 2-ovuled. Fruit winged all around.
2. **Planera.** Flowers appearing with the leaves. Ovule one. Fruit wingless, nut-like.

**Tribe II. CELTIDEÆ.** As in Tribe I., but the diœcious-polygamous flowers upon branches of the same year; anthers introrse; fruit a drupe; embryo curved.

3 **Celtis.** Ovary 1-ovuled. Flowers appearing with the leaves. Leaves 3-nerved at base.

**Tribe III. CANNABINEÆ.** Flowers diœcious: the sterile racemed or panicled; the fertile in clusters or catkins, the calyx of one sepal embracing the ovary. Filaments short, erect in the bud. Stigmas 2, elongated. Ovary 1-celled, with a pendulous ovule, forming a small glandular achene in fruit. Embryo curved or coiled. — Erect or climbing herbs, with watery juice, mostly opposite lobed or divided leaves, persistent stipules, and a fibrous inner bark.

4. **Cannabis.** Fertile flowers spiked-clustered. Leaves 5 – 7-divided. Erect.
5. **Humulus.** Fertile flowers in a short spike forming a membranaceous catkin in fruit. Leaves 3 – 5-lobed. Climbing.

**Tribe IV. MOREÆ.** Flowers unisexual, racemose, spicate or capitate; calyx becoming fleshy or juicy in fruit. Anthers inflexed in the bud. Style undivided or 2-parted, filiform; ovule pendulous; fruit an achene, embryo curved. — Trees or shrubs, with milky juice, alternate leaves, and fugacious stipules.

6. **Maclura.** Sterile flowers in loose racemes; fertile in globose heads. Leaves entire.
7. **Morus.** Fertile and sterile flowers in separate spikes. Leaves dentate, 3-nerved.

**Tribe V. URTICEÆ.** Flowers unisexual. Filaments inflexed in the bud. Style or stigma simple. Ovary 1-celled, with an erect ovule, forming an achene in fruit. Embryo straight. — Herbs with watery juice, tough fibrous bark, and opposite or alternate leaves; often armed with stinging hairs.

* Calyx in the fertile flowers of 2 – 5 separate or nearly separate sepals.

+ Plant beset with stinging bristles.

8. **Urtica.** Sepals 4 in both fertile and sterile flowers. Achene straight and erect, enclosed by the 2 inner and larger sepals. Stigma capitate-tufted. Leaves opposite.

9. **Laportea.** Sepals 5 in the sterile flowers, 4 in the fertile, or apparently only 2. Stigma long-subulate. Achene very oblique, deflexed, nearly naked. Leaves alternate.

+- +- Plant wholly destitute of stinging bristles. Leaves opposite.

10. **Pilea.** Sepals 3 or 4, those of the fertile flowers unequal, all or all but one small. Achene partly naked, straight and erect. Stigma pencil-tufted. Smòoth and shining.

* * Fertile calyx tubular or cup-shaped, enclosing the achene. Unarmed.

11. **Bœhmeria.** Flower-clusters spiked, not involucrate. Style long and thread-shaped, stigmatic down one side. Leaves opposite, serrate.

12. **Parietaria.** Flowers in involucrate-bracted clusters. Stigma tufted. Leaves alternate, entire.

## 1. ÚLMUS, L. ELM.

Calyx bell-shaped, 4 – 9-cleft. Stamens 4 – 9, with long and slender filaments. Ovary 1 – 2-celled, with a single anatropous ovule suspended from the summit of each cell; styles 2, short, diverging, stigmatic along the inner edge. Fruit a 1-celled and 1-seeded membranaceous samara, winged all around. Albumen none; embryo straight; the cotyledons large. — Flowers polygamous, purplish or yellowish, in lateral clusters, in our species preceding the leaves, which are strongly straight-veined, short-petioled, and oblique or unequally somewhat heart-shaped at base. Stipules small, caducous. (The classical Latin name.)

* *Flowers nearly sessile; fruit orbicular, not ciliate; leaves very rough above.*

1. **U. fúlva,** Michx. (SLIPPERY OR RED ELM.) Buds before expansion soft-downy with rusty hairs (large); leaves ovate-oblong, taper-pointed, doubly serrate (4 – 8′ long, sweet-scented in drying), soft-downy beneath or slightly rough downward; branchlets downy; calyx-lobes and stamens 5 – 9; fruit (8 – 9″ wide) with the cell pubescent. — Rich soil, N. Eng. to Dak., and southward. March, April. — A small or middle-sized tree (45 – 60° high), with tough reddish wood, and a very mucilaginous inner bark.

* * *Flowers on slender drooping pedicels, which are jointed above the middle; fruit ovate or oval, fringed-ciliate; leaves smooth above, or nearly so.*

2. **U. Americàna,** L. (AMERICAN OR WHITE ELM.) *Buds and branchlets* glabrous; *branches not corky;* leaves obovate-oblong or oval, abruptly pointed, sharply and often doubly serrate (2 – 4′ long), soft-pubescent beneath, or soon glabrous; *flowers in close fascicles;* calyx with 7 – 9 roundish lobes; *fruit glabrous* except the margins ($\frac{1}{2}$′ long), its sharp points incurved and closing the notch. — Moist woods, especially along rivers, in rich soil. April. — A large and well-known ornamental tree, variable in habit, usually with spreading branches and drooping branchlets.

3. **U. racemòsa,** Thomas. (CORK OR ROCK ELM.) *Bud-scales downy-ciliate* and somewhat pubescent, as are the young branchlets; *branches often with corky ridges;* leaves nearly as in the last, but with veins more simple and straight; *flowers racemed;* fruit much as in the last, but rather larger. — River-banks, S. W. Vt. to Ont. and central Minn., south to Mo. and Ky. A large and very valuable tree.

4. **U. alàta,** Michx. (WAHOO OR WINGED ELM.) *Bud-scales and branchlets nearly glabrous; branches corky-winged,* at least some of them; leaves downy beneath, ovate-oblong and oblong-lanceolate, acute, thickish, small

(1 – 2½′ long); calyx-lobes obovate; fruit downy on the face at least when young. — Va. to S. Ind., S. Mo., and southward. March. A small tree.

### 2. PLÁNERA, Gmelin. PLANER-TREE.

Flowers monœciously polygamous. Calyx 4 – 5-cleft. Stamens 4 – 5. Ovary ovoid, 1-celled, 1-ovuled, crowned with 2 spreading styles which are stigmatose down the inner side, in fruit becoming coriaceous and nut-like, not winged. Albumen none; embryo straight. — Trees with small leaves, like those of Elms, the flowers appearing with them, in small axillary clusters. (Named for *J. J. Planer*, a German botanist.)

1. **P. aquática,** Gmel. Nearly glabrous; leaves ovate-oblong, small; fruit stalked in the calyx, beset with irregular rough projections. — Wet banks, N. C. to Ky., S. Ill., and southward. April. A rather small tree.

### 3. CÉLTIS, Tourn. NETTLE-TREE. HACKBERRY.

Flowers monœciously polygamous. Calyx 5 – 6-parted, persistent. Stamens 5 – 6. Ovary 1-celled, with a single suspended ovule; stigmas 2, long and pointed, recurved. Fruit a globular drupe. Embryo curved, nearly enclosing a little gelatinous albumen; cotyledons folded and crumpled. — Leaves pointed, petioled, inequilateral. Stipules caducous. Flowers greenish, axillary, the fertile solitary or in pairs, peduncled, appearing with the leaves, the lower usually staminate only, fascicled or racemose along the base of the branches of the season. (A name of Pliny's for an African species of Lotus.)

1. **C. occidentàlis,** L. (SUGARBERRY. HACKBERRY.) *Leaves reticulated*, ovate, cordate-ovate and ovate-lanceolate, taper-pointed, usually conspicuously and sharply so, more or less oblique at base, *sharply serrate*, sometimes sparingly so or only toward the apex, scabrous but mostly glabrous above, usually soft-pubescent beneath, at least when young; fruit reddish or yellowish, turning dark purple at maturity, its peduncle once or twice the length of the petiole. — Woods and river-banks, N. Eng. to Minn., and southward. April, May. — A small or sometimes large tree, with the aspect of an Elm, bearing sweet and edible fruits as large as bird-cherries, at first obovate, ripe in autumn; the flesh thin. Very variable in the form, texture, etc., of the leaves. — Var. PÙMILA, Gray. Low and straggling (4 – 10° high); leaves thin when mature, and smooth, *slightly acuminate*. River-banks, on rocks, from Maryland southward.

2. **C. Mississippiénsis,** Bosc. *Leaves entire* (rarely few-toothed), *very long taper-pointed*, rounded at base, mostly oblique, thin, and smooth; fruit small. — Ill. to Tenn., and southward. A small tree with warty bark.

### 4. CÁNNABIS, Tourn. HEMP.

Flowers diœcious; the sterile in axillary compound racemes or panicles, with 5 sepals and 5 drooping stamens. Fertile flowers spiked-clustered, 1-bracted; the calyx of a single sepal enlarging at the base and folded round the ovary. Achene crustaceous. Embryo simply curved. — A tall roughish annual, with digitate leaves of 5 – 7 linear-lanceolate coarsely toothed leaflets, the upper alternate; the inner bark of very tough fibres. (The ancient Greek name, of obscure etymology.)

**C.** SATÌVA, L. (HEMP.) Stem 4 – 8° high; leaves 4 – 8′ broad; flowers green. — Waste and cultivated ground. (Adv. from Eu.)

### 5. HÙMULUS, L. Hop.

Flowers diœcious; the sterile in loose axillary panicles, with 5 sepals and 5 erect stamens. Fertile flowers in short axillary and solitary spikes or catkins; bracts foliaceous, imbricated, each 2-flowered, in fruit forming a sort of membranaceous strobile. Calyx of a single sepal, embracing the ovary. Achene invested with the enlarged scale-like calyx. Embryo coiled in a flat spiral. — Twining rough perennials, with stems almost prickly downward, and mostly opposite heart-shaped and palmately 3 – 7-lobed leaves, with persistent ovate stipules between the petioles. (A late Latin name, of Teutonic origin.)

1. **H. Lùpulus,** L. (Common Hop.) Leaves mostly 3 – 5-lobed, commonly longer than the petioles; bracts, etc., smoothish; the fruiting calyx, achene, etc., sprinkled with yellow resinous grains, which give the bitterness and aroma to the hop. — Alluvial banks, N. Eng. to western N. Y., the Great Lakes and westward, and south in the mountains to Ga. July. (Eu., Asia.)

### 6. MACLÙRA, Nutt. Osage Orange. Bois d'Arc.

Flowers diœcious; the staminate in loose short racemes, with 4-parted calyx, and 4 stamens inflexed in the bud; the pistillate in a dense globose head, with a 4-cleft calyx enclosing the ovary. Style filiform, long-exserted; ovule pendulous. Fruit an achene, buried in the greatly enlarged fleshy calyx. Albumen none. Embryo recurved. — Trees with milky juice, alternate entire pinnately veined leaves, caducous stipules, axillary peduncles, and stout axillary spines. (Named for the early American geologist, *William Maclure*.)

1. **M. aurantiaca,** Nutt. A tree 30 – 50° high; leaves ovate to oblong-lanceolate, pointed, mostly rounded at base, green and shining; syncarp globose, yellowish green, 2 – 3′ in diameter. — E. Kan. and Mo. to N. Tex.: extensively used for hedges. Wood bright orange.

### 7. MÒRUS, Tourn. Mulberry.

Flowers monœcious or diœcious; the two kinds in separate axillary and catkin-like spikes. Calyx 4-parted; lobes ovate. Stamens 4; filaments elastically expanding. Ovary 2-celled, one of the cells smaller and disappearing; styles 2, thread-form, stigmatic down the inside. Achene ovate, compressed, covered by the succulent berry-like calyx, the whole spike thus becoming a thickened oblong and juicy (edible) aggregate fruit. — Trees with milky juice and broad leaves; sterile spikes rather slender. (The classical Latin name.)

1. **M. rùbra,** L. (Red Mulberry.) *Leaves* heart-ovate, serrate, *rough above, downy beneath,* pointed (on young shoots often lobed); flowers frequently diœcious; *fruit dark purple,* long. — Rich woods, W. New Eng. to S. Ont., Dak., E. Kan., and southward. May. — Large tree, ripening its blackberry-like fruit in July.

**M. Álba,** L. (White Mulberry.) *Leaves* obliquely heart-ovate, acute, serrate, sometimes lobed, *smooth and shining; fruit whitish.* — Spontaneous near houses. (Adv. from Eu.)

### 8. URTÌCA, Tourn. Nettle.

Flowers monœcious, or rarely diœcious, clustered, the clusters mostly in racemes, spikes, or loose heads. *Ster. Fl.* Sepals 4. Stamens 4, inserted around the cup-shaped rudiment of a pistil. *Fert. Fl.* Sepals 4, in pairs; the 2 outer smaller and spreading; the 2 inner flat or concave, in fruit membranaceous and enclosing the straight and erect ovate flattened achene. Stigma sessile, capitate and pencil-tufted. — Herbs, armed with stinging hairs. Leaves opposite; stipules in our species distinct. Flowers greenish; in summer. (The classical Latin name; from *uro*, to burn.)

* *Perennials; flower-clusters in branching panicled spikes, often diœcious.*

1. **U. grácilis,** Ait. *Sparingly bristly,* slender (2 – 6° high); *leaves ovate-lanceolate,* pointed, serrate, 3 – 5-nerved from the rounded or scarcely heart-shaped base, *almost glabrous, the elongated slender petioles sparingly bristly;* spikes slender and loosely panicled. — Fence-rows and moist ground, common. Stings few.

**U.** DIÒICA, L. *Very bristly and stinging* (2 – 3° high); *leaves ovate, heart-shaped,* pointed, *very deeply serrate, downy beneath* as well as the upper part of the stem; *spikes much branched.* — Waste places and roadsides, rather rare. Canada and N. Eng. to S. C., west to Minn. and Mo. (Nat. from Eu.)

* * *Annuals; flower-clusters chiefly axillary and shorter than the petiole, androgynous.*

**U.** ÙRENS, L. *Leaves elliptical or ovate,* very coarsely and deeply serrate with long spreading teeth, the terminal teeth not longer than the lateral ones; *flower-clusters* 2 *in each axil, small and loose.* — Waste grounds, near dwellings, eastward; scarce. Plant 8 – 12′ high, with sparse stings. (Nat. from Eu.)

2. **U. chamædryoìdes,** Pursh. *Leaves ovate and mostly heart-shaped,* the upper ovate-lanceolate, coarsely serrate-toothed; *flower-clusters globular,* 1 – 2 in each axil, and spiked at the summit. — Alluvial shaded soil, from Ky. to the Gulf States. Slender, 6 – 30′ high, sparsely beset with stings.

### 9. LAPÓRTEA, Gaudichaud. WOOD-NETTLE.

Flowers monœcious or diœcious, clustered, in loose cymes; the upper widely spreading and chiefly or entirely fertile; the lower mostly sterile. *Ster. Fl.* Sepals and stamens 5, with a rudiment of an ovary. *Fert. Fl.* Calyx of 4 sepals, the two outer or one of them usually minute, and the two inner much larger. Stigma elongated awl-shaped, hairy down one side, persistent. Achene ovate, flat, extremely oblique, reflexed on the winged or margined pedicel, nearly naked. — Perennial herbs, with stinging hairs, large alternate serrate leaves, and axillary stipules. (Named for *M. Laporte.*)

1. **L. Canadénsis,** Gaudichaud. Stem 2 – 3° high; leaves ovate, pointed, strongly feather-veined (3 – 7′ long), long-petioled; fertile cymes divergent; stipule single, 2-cleft. — Moist rich woods. July – Sept.

### 10. PÍLEA, Lindl. RICHWEED. CLEARWEED.

Flowers monœcious or diœcious. *Ster. Fl.* Sepals and stamens 3 – 4. *Fert. Fl.* Sepals 3, oblong, more or less unequal; a rudiment of a stamen commonly before each in the form of a hooded scale. Stigma sessile, pencil-tufted. Achene ovate, compressed, erect, partly or nearly naked. — Stingless, mostly glabrous and low herbs, with opposite leaves and united stipules; the staminate flowers often mixed with the fertile. (Named from the shape of the larger sepal of the fertile flower in the original species, which partly covers the achene, like the *pileus,* or felt cap, of the Romans.)

1. **P. pùmila,** Gray. (RICHWEED. CLEARWEED.) Low (3–18′ high); stems smooth and shining, pellucid; leaves ovate, coarsely toothed, pointed, 3-ribbed and veiny; flower-clusters much shorter than the petioles; sepals of the fertile flowers lanceolate, scarcely unequal. — Cool and moist shaded places. July–Sept.

### 11. BŒHMÈRIA, Jacq. FALSE NETTLE.

Flowers monœcious or diœcious, clustered; the sterile much as in Urtica; the fertile with a tubular or urn-shaped entire or 2–4-toothed calyx enclosing the ovary. Style elongated awl-shaped, stigmatic and papillose down one side. Achene elliptical, closely invested by the dry and persistent compressed calyx. — No stings. (Named after *G. R. Boehmer*, Professor at Wittenberg in the last century.)

1. **B. cylíndrica,** Willd. Perennial, smoothish or pubescent and more or less scabrous; stem (1–3° high) simple; leaves chiefly opposite (rarely all alternate), ovate to ovate- or oblong-lanceolate, pointed, serrate, 3-nerved; stipules distinct; petioles short or elongated; flowers diœcious, or the two kinds intermixed, the small clusters densely aggregated in simple and elongated axillary spikes, the sterile interrupted, the fertile often continuous, frequently leaf-bearing at the apex. — Moist or shady ground, common. Very variable.

### 12. PARIETÀRIA, Tourn. PELLITORY.

Flowers monœciously polygamous; the staminate, pistillate, and perfect intermixed in the same involucrate-bracted cymose axillary clusters; the sterile much as in the last; the fertile with a tubular or bell-shaped 4-lobed and nerved calyx, enclosing the ovary and the ovoid achene. Style slender or none; stigma pencil-tufted. — Homely, diffuse or tufted herbs, not stinging, with alternate entire 3-ribbed leaves, and no stipules. (The ancient Latin name, because growing on old walls.)

1. **P. Pennsylvánica,** Muhl. Low, annual, simple or sparingly branched, minutely downy; leaves oblong-lanceolate, thin, veiny, roughish with opaque dots; flowers shorter than the involucre; stigma sessile. — Shaded rocky banks, E. Mass. and Vt. to Minn., and southward. June–Aug.

## ORDER 100. PLATANÀCEÆ. (PLANE-TREE FAMILY.)

*Trees, with watery juice, alternate palmately-lobed leaves, sheathing stipules, and monœcious flowers in separate and naked spherical heads, destitute of calyx or corolla; the fruit merely club-shaped 1-seeded nutlets, furnished with a ring of bristly hairs about the base;* consists only of the following genus (of uncertain relationship).

### 1. PLÁTANUS, L. SYCAMORE. BUTTONWOOD.

Sterile flowers of numerous stamens, with club-shaped little scales intermixed; filaments very short. Fertile flowers in separate catkins, consisting of inversely pyramidal ovaries mixed with little scales. Style rather lateral, awl-shaped or thread-like, simple. Nutlets coriaceous, small, tawny-hairy below, containing a single orthotropous pendulous seed. Embryo in the axis of thin albumen. — Large trees, with the bark deciduous in broad thin brittle plates; dilated base of the petiole enclosing the bud of the next season. (The ancient name, from πλατύς, *broad*.)

1. **P. occidentàlis,** L. Leaves mostly truncate at base, angularly sinuate-lobed or toothed, the short lobes sharp-pointed; fertile heads solitary, hanging on a long peduncle. — Alluvial banks, S. Maine to N. Vt., Ont., S. E. Minn., E. Kan., and southward. Our largest tree, often 90 – 130° high, with a trunk 6 – 14° in diameter.

## ORDER 101. JUGLANDÀCEÆ. (WALNUT FAMILY.)

*Trees, with alternate pinnate leaves, and no stipules; flowers monœcious, the sterile in catkins (aments) with an irregular calyx adnate to the bract; the fertile solitary or in a small cluster or spike, with a regular 3 – 5-lobed calyx adherent to the incompletely 2 – 4-celled but only 1-ovuled ovary. Fruit a kind of dry drupe, with a crustaceous or bony nut-shell, containing a large 4-lobed orthotropous seed.* Albumen none. Cotyledons fleshy and oily, sinuous or corrugated, 2-lobed; radicle short, superior. Petals sometimes present in the fertile flowers. — A small family of important trees, consisting chiefly of the two following genera.

### 1. JÙGLANS, L. WALNUT.

Sterile flowers in long and simple lateral catkins from the wood of the preceding year; the calyx adherent to the entire bracts or scales, unequally 3 – 6-cleft. Stamens 12 – 40; filaments free, very short. Fertile flowers solitary or several together on a peduncle at the end of the branches, with a 4-toothed calyx, bearing 4 small petals at the sinuses. Styles 2, very short; stigmas 2, somewhat club-shaped and fringed. Fruit with a fibrous-fleshy indehiscent epicarp, and a mostly rough irregularly furrowed endocarp or nut-shell. — Trees, with strong-scented or resinous-aromatic bark, few-scaled or almost naked buds (3 or 4 superposed, and the uppermost far above the axil), odd-pinnate leaves of many serrate leaflets, and the embryo sweet and edible. Pith in plates. (Name contracted from *Jovis glans*, the nut of Jupiter.)

1. **J. cinèrea,** L. (BUTTERNUT. WHITE WALNUT.) Leaflets 5 – 8 pairs, oblong-lanceolate, pointed, rounded at base, downy, especially beneath, the *petioles and branchlets downy with clammy hairs; fruit oblong, clammy,* pointed, the nut deeply sculptured and rough with ragged ridges, 2-celled at the base. — Rich woods, N. Eng. to the mountains of Ga., west to Minn., E. Kan., and Ark. Tree 50 – 75° high, with gray bark, widely spreading branches, and lighter brown wood than in the next.

2. **J. nìgra,** L. (BLACK WALNUT.) Leaflets 7 – 11 pairs, ovate-lanceolate, taper-pointed, somewhat heart-shaped or unequal at base, smooth above, the lower surface and the *petioles minutely downy; fruit spherical,* roughly dotted, the nut corrugated, 4-celled at top and bottom. — Rich woods, W. Mass. and Conn. to Fla., west to Minn., E. Neb., E. Kan., and southward. A large and handsome tree (often 90 – 150° high), with rough brown bark, and valuable purplish-brown wood turning blackish with age.

## 2. CÁRYA, Nutt. HICKORY.

Sterile flowers in slender lateral and clustered catkins; calyx naked, adherent to the bract, unequally 2–3-parted. Stamens 3–10; filaments short or none, free. Fertile flowers 2–5 in a cluster or short spike, on a peduncle terminating the shoot of the season; calyx 4-toothed; petals none. Stigmas sessile, 2 or 4, large, papillose, persistent. Fruit with a 4-valved, firm and at length dry exocarp (involucre), falling away from the smooth and crustaceous or bony endocarp or nut-shell, which is incompletely 2-celled, and at the base mostly 4-celled. — Fine timber-trees, with hard and very tough wood, and scaly buds, from which in spring are put forth usually both kinds of flowers, the sterile below and the fertile above the leaves. Nuts ripen and fall in October. (Καρύα, an ancient name of the Walnut.)

§ 1. *Sterile catkins fascicled (no common peduncle or sometimes a very short one) from separate lateral scaly buds near the summit of shoots of the preceding year; bud-scales few; fruit elongated-oblong; the thin-shelled nut 2-celled below; seed sweet; leaflets short-stalked, numerous.*

1. **C. olivæfórmis,** Nutt. (PECAN-NUT.) Minutely downy, becoming nearly smooth; leaflets 13–15, oblong-lanceolate, tapering gradually to a slender point, falcate, serrate; nut olive-shaped. — River bottoms, S. Ind., S. Ill., and Iowa, to La. and Tex. A large tree (90–160° high), with delicious nuts.

§ 2. *Sterile catkins in threes (rarely more) on a common peduncle from the axil of the inner scales of the common bud, therefore at the base of the shoot of the season, which, then bearing 3 or 4 leaves, is terminated by the fertile flowers; fruit globular or oval; nut 4-celled at base; leaflets sessile or nearly so.*

* *Bud-scales numerous, about 10, successively enwrapping, the inner ones accrescent, becoming thin and membranaceous and rather tardily deciduous; husk of the fruit splitting promptly into 4 more or less thick and when dry hard or woody valves; seed sweet and delicious.* (The *hickory nuts* of the market.)

2. **C. álba,** Nutt. (SHELL-BARK or SHAG-BARK HICKORY.) Bark of trunk shaggy, exfoliating in rough strips or plates; inner bud-scales becoming large and conspicuous, persistent till the flowers are fully developed; *leaflets* 5–7, when young minutely downy beneath, finely serrate, the three upper obovate-lanceolate, the *lower pair much smaller* and oblong-lanceolate, all taper-pointed; fruit globular or depressed; *nut white,* flattish-globular, barely mucronate, the shell thinnish. — N. Eng. to N. shore of L. Erie and S. E. Minn., south to Fla., E. Kan., and Tex. Large and handsome tree (70–90° high, or more), of great economic value. The principal hickory-nut of the markets.

3. **C. sulcàta,** Nutt. (BIG SHELL-BARK. KING-NUT.) Bark, etc., as in n. 1; *leaflets* 7–9, more downy beneath; *fruit oval or ovate,* 4-ribbed above the middle, the husk very thick; *nut large* (1¼–2′ long) and usually angular, *dull white or yellowish, thick-walled, usually strongly pointed at both ends.* — Central N. Y. and Penn. to S. Ind., E. Kan., and Ind. Terr. Tree 70–90° high, or more, in rich soil of bottom lands.

4. **C. tomentòsa,** Nutt. (MOCKER-NUT. WHITE-HEART HICKORY.) *Bark close,* rough, but not shaggy and exfoliating on old trunks; catkins, shoots, and lower surface of the leaves *tomentose* when young, resinous-scented;

*leaflets* 7–9, lance-obovate or the lower oblong-lanceolate, pointed; *fruit globular or ovoid*, with a very thick and hard husk; *nut globular, not compressed, 4-ridged toward the slightly pointed summit, brownish*, very thick-shelled, 1′ in diameter or smaller. — N. Eng. to N. shore of L. Erie, E. Neb., and south to the Gulf. Tree 70–100° high, usually on rich upland hillsides.

5. **C. microcárpa**, Nutt. With rough close bark, small ovate buds, and the glabrous foliage, etc., of n. 6; fruit small, subglobose, with rather thin husk; nut thin-shelled, not angled. — N. Y. to Del., west to Mich. and Ill.

* * *Bud-scales numerous or few; husk of the fruit thin and rather friable at maturity, 4-valved only to the middle or tardily to near the base; seed more or less bitter; bark of old trunk not exfoliating.*

6. **C. porcìna**, Nutt. (PIG-NUT or BROOM H.) Bud-scales nearly as in n. 4, but smaller, caducous; shoots, catkins, and leaves *glabrous* or nearly so; *leaflets* 5–7, oblong- or obovate-lanceolate and taper-pointed, serrate; fruit pear-shaped, oblong, or oval; *nut oblong or oval* (1½–2′ long), with a *thick bony shell;* the oily seed at first sweet in taste, then bitterish. — S. Maine to Fla., west to Minn., E. Neb., and Tex. Tree 70–90° high (rarely 120°), on dry hills and uplands.

7. **C. amàra**, Nutt. (BITTER-NUT or SWAMP H.) Scales of the small yellowish buds about 6, valvate in pairs, caducous in leafing; catkins and young herbage more or less pubescent, soon becoming almost glabrous: *leaflets* 7–11, *lanceolate* or oblong-lanceolate; fruit globular, narrowly 6-ridged; *nut globular, short-pointed*, white (barely 1′ long), *thin-walled;* seed at first sweet-tasted, soon extremely bitter. — Moist soil, N. Eng. to Fla., west to Minn., E. Neb., and Tex. Tree 50–75° high; husk and nut-shell thinner and less hard than in other species.

## ORDER 102. MYRICÀCEÆ. (SWEET-GALE FAMILY.)

*Monœcious or diœcious shrubs, with both kinds of flowers in short scaly catkins, and resinous-dotted often fragrant leaves,* — differing from the Birches chiefly in the 1-celled ovary with a single erect orthotropous ovule, and the drupe-like nut. Involucre and perianth none.

### 1. MYRÌCA, L. BAYBERRY. WAX-MYRTLE.

The only genus. — Flowers solitary under a scale-like bract and with a pair of bractlets, the sterile in oblong or cylindrical, the fertile in ovoid or globular catkins, from axillary scaly buds; stamens 2–8; filaments somewhat united below; anthers 2-celled. Ovary with 2–8 scales at its base, and 2 thread-like stigmas. Fruit a small globular or oblong nut, or dry drupe, coated with resinous grains or wax. (Μυρίκη, the ancient name of the Tamarisk or some other shrub; perhaps from μυρίζω, *to perfume.*)

* *Mostly diœcious; fertile catkins ovoid; ovary with 2–4 scales at base; nut globular; leaves entire or somewhat serrate.*

1. **M. Gàle**, L. (SWEET GALE.) Shrub 3–5° high; *leaves wedge-lanceolate*, serrate toward the apex, *pale, later than the flowers; sterile catkins closely clustered;* nuts in imbricated heads, 2-winged by the two thick ovate

scales which coalesce with its base. — Wet borders of ponds, Newf. to N. Eng. and along the Great Lakes to Minn., south in the mountains to Va.

2. **M. cerífera**, L. (BAYBERRY. WAX-MYRTLE.) *Leaves oblong-lanceolate*, narrowed at the base, entire or wavy-toothed toward the apex, *shining and resinous-dotted both sides, somewhat preceding the flowers, fragrant; sterile catkins scattered*, oblong; scales wedge-shaped at the base; nuts scattered and naked, bony, and incrusted with white wax. — Sandy soil near the coast, from Nova Scotia to Fla. and Ala.; also on L. Erie. Shrub 3 – 8° high, but sometimes a tree 35° high; fruit sometimes persistent for 2 or 3 years.

* * *Frequently monœcious; fertile catkins globular; ovary surrounded by* 8 *long linear-awl-shaped persistent scales; nut ovoid-oblong; leaves pinnatifid with many rounded lobes.*

3. **M. asplenifòlia**, Endl. Shrub 1 – 2° high, with sweet-scented fern-like linear-lanceolate leaves; stipules half heart-shaped; scales of the sterile catkins kidney-heart-shaped, pointed. (Comptonia asplenifolia, *Ait.*) — Sterile hills, N. Eng. to N. C., west to Minn. and Ind. Known as *Sweet Fern.*

## ORDER 103. CUPULÌFERÆ. (OAK FAMILY.)

*Monœcious trees or shrubs, with alternate simple straight-veined leaves, deciduous stipules, the sterile flowers in catkins* (*or capitate-clustered in the* Beech), *the fertile solitary, clustered, spiked, or in scaly catkins, the* 1-*celled and* 1-*seeded nut with or without an involucre.* Ovary more or less 2 – 7-celled, with 1 or 2 pendulous anatropous ovules in each cell; but all the cells and ovules except one disappearing in the fruit. Seed with no albumen, filled with the embryo.

**Tribe I. BETULEÆ.** Flowers in scaly catkins, 2 or 3 to each bract. Sterile catkins pendulous. Stamens 2 – 4, and calyx usually 2 - 4-parted. Fertile flowers with no calyx, and no involucre to the compressed and often winged small nut. Ovary 2-celled, 2-ovuled.

1. **Betula.** Stamens 2, bifid. Fertile scales thin, 3-lobed, deciduous with the nuts.
2. **Alnus.** Stamens 4. Fertile scales thick, entire, persisting after the nuts have fallen.

**Tribe II. CORYLEÆ.** Sterile catkins pendulous, with no calyx; stamens 3 or more to each bract and more or less adnate to it, the filaments often forked (anthers 1-celled). Fertile flowers in a short ament or head, 2 to each bract, and each with one or more bractlets which form a foliaceous involucre to the nut. Ovary 2-celled, 2-ovuled.

* Bract of staminate flower furnished with a pair of bractlets inside; fertile flowers few.

3. **Corylus.** Involucre leafy-coriaceous, enclosing the large bony nut.

* * Bract of staminate flower simple; fertile flowers in short catkins; nut small, achene-like.

4. **Ostrya.** Each ovary and nut included in a bladdery and closed bag.
5. **Carpinus.** Each nut subtended by an enlarged leafy bractlet.

**Tribe III. QUERCINEÆ.** Sterile flowers with 4 – 7-lobed calyx and stamens indefinite (3 – 20). Fertile flowers 1 or few, enclosed in a cupule consisting of consolidated bracts, which becomes indurated (scaly or prickly) and surrounds or encloses the nut.

* Sterile flowers in slender catkins.

6. **Quercus.** Cupule 1-flowered, scaly and entire; nut hard and terete.
7. **Castanea.** Cupule 2 - 4-flowered, forming a prickly hard bur, 2 – 4-valved when ripe.

* * Sterile flowers in a small head.

8. **Fagus.** Cupule 2-flowered, 4-valved, containing 2 sharply triangular nuts.

## 1. BÉTULA, Tourn. Birch.

Sterile flowers 3, and bractlets 2, to each shield-shaped scale or bract of the catkins, consisting each of a calyx of one scale bearing 4 short filaments with 1-celled anthers (or strictly of two 2-parted filaments, each division bearing an anther-cell). Fertile flowers 2 or 3 to each 3-lobed bract, without bractlets or calyx, each of a naked ovary, becoming a broadly winged and scale-like nutlet (or small samara) crowned with the two spreading stigmas. — Outer bark usually separable in sheets, that of the branchlets dotted. Twigs and leaves often spicy-aromatic. Foliage mostly thin and light. Buds sessile, scaly. Sterile catkins long and drooping, terminal and lateral, sessile, formed in summer, remaining naked through the succeeding winter, and expanding their golden flowers in early spring, with or preceding the leaves; fertile catkins oblong or cylindrical, peduncled, usually terminating very short 2-leaved early lateral branches of the season. (The ancient Latin name, of Celtic origin.)

* *Trees, with brown or yellow-gray bark, sweet-aromatic as well as the twigs, membranaceous and straight-veined Hornbeam-like leaves heart-shaped or rounded at base, on short petioles, and sessile very thick fruiting catkins; their scales about equally 3-cleft, rather persistent; wing of fruit not broader than the seed-bearing body.*

1. **B. lénta,** L. (Cherry B. Sweet or Black Birch.) *Bark* of trunk *dark brown, close* (outer layers scarcely laminate), very sweet-aromatic; leaves ovate or oblong-ovate from a more or less heart-shaped base, acuminate, sharply and finely doubly serrate all round, when mature shining or bright green above and glabrous except on the veins beneath; *fruiting catkins oblong-cylindrical* (1 – 1½′ long), the scales with short and *divergent lobes.* — Rich woodlands, Newf. to N. Del., and south in the mountains, west to Minn., and S. Ind. Tree 50 – 75° high, with reddish bronze-colored spray; wood rose-colored, fine-grained, valuable for cabinet-work.

2. **B. lùtea,** Michx. f. (Yellow or Gray Birch.) *Bark* of trunk *yellowish- or silvery-gray, detaching in very thin filmy layers,* within and the twigs much less aromatic; leaves (3 – 5′ long) slightly or not at all heart-shaped and often narrowish toward the base, duller-green above and usually more downy on the veins beneath; fruiting catkins *oblong-ovoid* (1′ or less in length, 6 – 9″ thick), the thinner scales (5 – 6″ long) twice as large as in n. 1, and with narrower *barely spreading lobes.* — Rich moist woodlands, Canada and N. Eng. to Del., west to Minn.; also along high peaks to Tenn. and N. C. Often 60 – 90° high at the north; wood whiter and less valuable.

* * *Trees, with chalky-white bark separable in thin sheets, ovate or triangular leaves of firmer texture, on long slender petioles; fruiting catkins cylindrical, usually hanging on rather slender peduncles; their scales glabrous, with short diverging lobes, freely deciduous; wing of the fruit much broader than its body.*

3. **B. populifòlia,** Ait. (American White Birch. Gray Birch.) Trunk usually ascending (15 – 30° high); *leaves triangular* (deltoid), *very taper-pointed* (usually abruptly), truncate or nearly so at the broad base, *smooth and shining both sides,* except the resinous glands when young. (B. alba, var.

populifolia, *Spach.*) — Poor sandy soils, N. Brunswick to Del., west to L. Ontario. Bark much less separable than the next; leaves on slender petioles, tremulous as those of the aspen.

4. **B. papyrífera,** Marshall. (PAPER OR CANOE BIRCH. WHITE BIRCH.) *Leaves ovate, taper-pointed,* heart-shaped or abrupt (or rarely wedge-shaped) at base, *smooth and green above,* pale, glandular-dotted, and a little hairy on the veins beneath, sharply and unequally doubly serrate, 3 – 4 times the length of the petiole. (B. papyracea, *Ait.*) — Rich woodlands and stream-banks, N. Eng. to N. Penn., N. Ill., and Minn., and far north and westward. Tree 50 – 75° high, with bark freely splitting into paper-like layers. — Var. MINOR, Tuckerman, is a dwarf form of the alpine region of the White Mts.

* * * *Tree, with greenish-brown bark, somewhat laminate, and reddish twigs, ovate leaves whitish beneath, and soft-downy peduncled fruiting catkins.*

5. **B. nìgra,** L. (RIVER OR RED BIRCH.) Leaves rhombic-ovate, acutish at both ends, irregularly doubly serrate, whitish and (until old) downy underneath; petioles and peduncle of nearly the same length (3 – 7″) and with the oblong catkin tomentose; the bracts with oblong-linear nearly equal lobes; fruit broadly winged. — Banks of streams, Mass. to Fla., west to Minn., E. Kan., and Tex. Tree 50 – 75° high, with light-colored wood and somewhat Alder-like leaves.

* * * * *Shrubs, with brownish bark, rounded or wedge-shaped crenate and mostly small leaves of thickish or coriaceous texture, and oblong or cylindrical glabrous and mostly erect catkins, on short peduncles.*

6. **B. pùmila,** L. (LOW BIRCH.) Stems (2 – 8° high) erect or ascending, *not glandular;* young branches and lower face of young leaves mostly *soft-downy; leaves* obovate, roundish, or orbicular (6 – 16″ long), *pale beneath, veinlets on both faces finely reticulated;* wing of the fruit mostly narrower than the body. — Bogs, W. Conn. and N. J. to Ind. and Minn., and northward throughout Canada. Leaves usually not at all resiniferous or glandular-dotted.

7. **B. glandulòsa,** Michx. (DWARF BIRCH.) Stems erect or mostly spreading (1 – 4° high), or when alpine procumbent; *branchlets glabrous, conspicuously dotted with resinous wart-like glands;* leaves roundish wedge-obovate or sometimes orbicular (6 – 9″ long), green and glabrous both sides, less reticulated; fruiting catkins mostly shorter and oblong or oval; wing of the fruit narrower than or sometimes equalling the body. — High mountains of N. Eng. and N. Y., to L. Superior, and far northward.

## 2. ÁLNUS, Tourn. ALDER.

Sterile catkins elongated and drooping, with 4 or 5 bractlets and 3 (rarely 6) flowers upon each short-stalked shield-shaped scale; each flower usually with a 3 – 5-parted calyx and as many stamens; filaments short and simple; anthers 2-celled. Fertile catkins ovoid or oblong; the fleshy scales each 2 – 3-flowered, with a calyx of 4 little scales adherent to the scales or bracts of the catkin, which are thick and woody in fruit, wedge-obovate, truncate, or 3 – 5-lobed, and persistent. — Shrubs or small trees, with few-scaled leaf-buds, and solitary or often racemose-clustered catkins, terminating leafless branchlets or peduncles. (The ancient Latin name.)

§ 1. *Flowers developed in spring with the leaves; the sterile from catkins which have remained naked over winter; while the fertile have been enclosed in a scaly bud; fruit with a conspicuous thin wing, as in* Birch.

1. **A. víridis,** DC. (GREEN or MOUNTAIN ALDER.) Shrub 3–8° high; leaves round-oval, ovate, or slightly heart-shaped, glutinous and smooth or softly downy beneath, irregularly serrulate or biserrulate with very sharp and closely set teeth, sometimes sinuate-toothed and serrulate (var. SINUÀTA, Regel), on young shoots often cut-toothed; fertile catkins slender-stalked, clustered, ovoid (6–8″ long). — On mountains and mountain streams, Newf. to W. Mass., N. Y., L. Superior, and far north and west; also in the Alleghanies to N. C. (Eu., Asia.)

§ 2. *Flowers developed in earliest spring, before the leaves, from mostly clustered catkins which (of both sorts) were formed the foregoing summer and have remained naked over winter; fruit wingless or with a narrow coriaceous margin.*

2. **A. incàna,** Willd. (SPECKLED or HOARY A.) *Leaves broadly oval or ovate, rounded at base,* sharply and often doubly serrate, *whitened and mostly downy beneath;* stipules oblong-lanceolate; fruit orbicular. — Borders of streams and swamps, Newf. to Mass., E. Neb., Minn., and westward. Shrub or tree 8–20° high; the common Alder northward. (Eu., Asia.)

3. **A. serrulàta,** Willd. (SMOOTH A.) *Leaves obovate, acute at base,* sharply serrate with minute teeth, thickish, *green both sides,* smooth or often downy beneath; stipules oval; fruit ovate. — Borders of streams and swamps, Mass. to Fla., west to S. E. Minn. and Tex.; common. Shrub forming dense thickets, or sometimes at the south a small tree 6–35° high.

§ 3. *Flowers in autumn (Sept.) from catkins of the season; the fertile mostly solitary in the axils of the leaves, ripening the fruit a year later; fruit wingless.*

4. **A. marítima,** Muhl. (SEA-SIDE A.) Glabrous; leaves oblong, ovate, or obovate with a wedge-shaped base, slender-petioled, sharply serrulate, bright green, or rather rusty beneath; fruiting catkins large, ovoid or oblong (9–12′ long, 6″ thick). — Borders of streams and swamps. S. Del. and E. Md., near the coast. Small tree 15–25° high. (E. Asia.)

### 3. CÓRYLUS, Tourn. HAZEL-NUT. FILBERT.

Sterile flowers in drooping cylindrical catkins, consisting of 8 (half-) stamens with 1-celled anthers, their short filaments and pair of scaly bractlets cohering more or less with the inner face of the scale of the catkin. Fertile flowers several in a scaly bud, each a single ovary in the axil of a scale or bract, and accompanied by a pair of lateral bractlets; ovary tipped with a short limb of the adherent calyx, incompletely 2-celled, with 2 pendulous ovules, one of them sterile; style short; stigmas 2, elongated and slender. Nut ovoid or oblong, bony, enclosed in a leafy or partly coriaceous cup or involucre, consisting of the two bractlets enlarged and often grown together, lacerated at the border. Cotyledons very thick (raised to the surface in germination), edible; the short radicle included. — Shrubs or small trees, with thinnish doubly-toothed leaves, folded lengthwise in the bud, flowering in early spring; sterile catkins single or fascicled from scaly buds of the axils of the preceding year, the fertile terminating early leafy shoots. (The classical name, probably from κόρυς, *a helmet*, from the involucre.)

1. **C. Americàna**, Walt. (WILD HAZEL-NUT.) *Leaves roundish-heart-shaped*, pointed; *involucre open above* down to the globose nut, *of 2 broad foliaceous cut-toothed almost distinct bracts*, their base coriaceous and downy, or with glandular bristles intermixed. — Thickets, N. Eng. to Ont. and Dak., and southward. Twigs and petioles often glandular-bristly.

2. **C. rostràta**, Ait. (BEAKED HAZEL-NUT.) *Leaves ovate or ovate-oblong, somewhat heart-shaped*, pointed; *involucre of united bracts, much prolonged* above the ovoid nut *into a narrow tubular beak, densely bristly.* — N. Scotia to northern N. J., Mich., Minn., and westward, and south in the mountains to Ga. Shrub 2 – 6° high.

### 4. ÓSTRYA, Micheli. HOP-HORNBEAM. IRON-WOOD.

Sterile flowers in drooping cylindrical catkins, consisting of several stamens in the axil of each bract; filaments short, often forked, bearing 1-celled (half-) anthers; their tips hairy. Fertile flowers in short catkins; a pair to each deciduous bract, each of an incompletely 2-celled 2-ovuled ovary, crowned with the short bearded border of the adherent calyx, tipped with 2 long-linear stigmas, and enclosed in a tubular bractlet, which in fruit becomes a closed bladdery oblong bag, very much larger than the small and smooth nut; these inflated involucres loosely imbricated to form a sort of strobile, in appearance like that of the Hop. — Slender trees, with very hard wood, brownish furrowed bark, and foliage resembling that of Birch; leaves open and concave in the bud, more or less plaited on the straight veins. Flowers in spring, appearing with the leaves; the sterile catkins 1 – 3 together from scaly buds at the tip of the branches of the preceding year; the fertile single, terminating short leafy shoots of the season. (The classical name.)

1. **O. Virgínica**, Willd. (AMERICAN HOP-HORNBEAM. LEVER-WOOD.) Leaves oblong-ovate, taper-pointed, very sharply doubly serrate, downy beneath, with 11 – 15 principal veins; buds acute; involucral sacs bristly-hairy at the base. — Rich woods, common, from the Atlantic to N. Minn., Neb., E. Kan., and southward. Tree 25 – 45° high; hop-like strobiles full-grown in Aug.

### 5. CARPÌNUS, L. HORNBEAM. IRON-WOOD.

Sterile flowers in drooping cylindrical catkins, consisting of several stamens in the axil of a simple and entire scale-like bract; filaments very short, mostly 2-forked, the forks bearing 1-celled (half-) anthers with hairy tips. Fertile flowers several, spiked in a sort of loose terminal catkin, with small deciduous bracts, each subtending a pair of flowers, as in Ostrya; but the single involucre-like bractlet is open, enlarged in fruit and foliaceous, merely subtending the small ovate several-nerved nut. — Trees or tall shrubs, with smooth close gray bark, in this and in the slender buds and straight-veined leaves resembling the Beech; leaf-buds and inflorescence as in Ostrya. (The early Latin name.)

1. **C. Caroliniàna**, Walter. (AMERICAN HORNBEAM. BLUE or WATER BEECH.) Leaves ovate-oblong, pointed, sharply doubly serrate, soon nearly smooth; bractlets 3-lobed, halberd-shaped, sparingly cut-toothed on one side, acute. (C. Americana, *Michx.*) — Along streams, N. Scotia to Fla., west to

Minn., Iowa, E. Kan., and Tex. Tree or shrub, 10–45° high, with ridged trunk, and very hard wood.

## 6. QUÉRCUS, L. OAK.

Sterile flowers in slender naked catkins; bracts caducous; calyx 2–8-parted or lobed; stamens 3–12; anthers 2-celled. Fertile flowers scattered or somewhat clustered, consisting of a nearly 3-celled and 6-ovuled ovary, with a 3-lobed stigma, enclosed by a scaly bud-like involucre which becomes an indurated cup (*cupule*) around the base of the rounded nut or acorn. Cotyledons remaining underground in germination; radicle very short, included. — Flowers greenish or yellowish. Sterile catkins single or often several from the same lateral scaly bud, filiform and hanging in all our species. (The classical Latin name.) All flower in spring, and shed their nuts in Oct. of the same or the next year.

§ 1. LEUCOBÁLANUS. *Bark pale, often scaly; leaves and their lobes or teeth obtuse, never bristle-pointed; stamens* 6–8; *scales of the cup more or less knobby at base; stigmas sessile or nearly so; abortive ovules at the base of the perfect seed; inner surface of nut glabrous; fruit maturing the first year, often peduncled; kernel commonly sweetish; wood tough and dense.*

* *Leaves deciduous, lyrate or sinuate-pinnatifid, pale beneath.* — WHITE OAKS.

1. **Q. álba,** L. (WHITE OAK.) Mature *leaves smooth, pale or glaucous underneath, bright green above,* obovate-oblong, obliquely cut into 3–9 oblong or linear and obtuse mostly entire lobes; *cup hemispherical-saucer-shaped, rough or tubercled at maturity, naked, much shorter than the ovoid or oblong acorn* (1′ long). — All soils, Maine to S. E. Minn., E. Kan., and south to the Gulf. A large and valuable tree; lobes of the leaves short and broad (3–5), or deep and narrow (5–9).

2. **Q. stellàta,** Wang. (POST OAK. IRON OAK.) *Leaves grayish or yellowish-downy underneath, pale and rough above, thickish,* sinuately cut into 5–7 rounded divergent lobes, the upper ones much larger and often 1–3-notched; *cup deep saucer-shaped, naked, one third or half the length of the ovoid acorn* (6–9″ long). (Q. obtusiloba, *Michx.*) — Sandy or sterile soil, Martha's Vineyard to Mich. and E. Neb., south to Fla. and Tex.; common, especially southward. A small tree with very durable wood.

3. **Q. macrocárpa,** Michx. (BUR OAK. OVER-CUP or MOSSY-CUP OAK.) *Leaves* obovate or oblong, *lyrately-pinnatifid or deeply sinuate-lobed, or nearly parted,* sometimes nearly entire, irregular, downy or pale beneath; the lobes sparingly and obtusely toothed, or the smaller ones entire; *cup deep,* thick and woody (9″–2′ across), conspicuously imbricated with hard and thick *pointed scales, the upper ones awned,* so as usually to make a mossy-fringed border; *acorn* broadly ovoid (1–1½′ long), *half immersed in or entirely enclosed by the cup.* — Rich soil, N. Scotia to W. Mass. and Penn., west to Minn., central Neb., and Kan. A large and valuable tree; extremely variable in the size and fringe of the acorns. — Var. OLIVÆFÓRMIS, Gray, is only a narrower-leaved form with unusually small oblong acorns.

4. **Q. lyràta,** Walt. (OVER-CUP OAK. SWAMP POST OAK.) Leaves crowded at the end of the branchlets, obovate-oblong, acute at base, more or less deeply 7–9-*lobed, white-tomentose beneath* or at length smoothish, *the lobes triangular to oblong, acute or obtuse, entire* or sparingly toothed; fruit short-peduncled

or sessile; cup round-ovate, thin, *with rugged scales, almost covering the depressed-globose acorn* (8 – 10″ long). — River swamps, S. E. Mo. to S. Ind., Tenn., N. C., and southward. — A large tree, with flaky bark; intermediate between n. 3 and n. 5.

* * *Leaves coarsely sinuate-toothed, but not lobed* (except slightly in n. 5), *whitish and more or less downy beneath; cup hoary, hemispherical or a little depressed, about half as long as the oblong-ovoid edible acorn.* — CHESTNUT-OAKS.

5. **Q. bícolor,** Willd. (SWAMP WHITE OAK.) *Leaves* obovate or oblong-obovate, *wedge-shaped at base, coarsely sinuate-crenate* and often rather *pinnatifid* than toothed, usually *soft-downy and white-hoary* beneath, the main primary veins 6 – 8 pairs, lax and little prominent; fruiting *peduncle much longer than the petiole;* upper scales of the cup awn-pointed, sometimes forming a mossy-fringed margin; acorn scarcely 1′ long. — Borders of streams and swamps, S. Maine to Ont., Minn., and E. Kan., and south in the mountains to N. Ga. — A large tree, with flaky bark.

6. **Q. Michaùxii,** Nutt. (BASKET-OAK. COW-OAK.) Leaves (5 – 6′ long) oval or obovate, acute, *obtuse or even cordate at base,* regularly *dentate* (commonly not deeply), *rather rigid, usually very tomentose beneath; stamens usually* 10; fruit short-peduncled; cup shallow, tuberculate with hard and stout acute scales, without fringe; acorn 1½′ long. (Q. Prinus, var Michauxii, *Chapm.*) — Borders of streams and swamps, Del. to Fla., and in the west from S. Ind. to Mo., and south to the Gulf. — A large and valuable tree, with gray flaky bark and large sweet edible acorns. Intermediate forms appear to connect with n. 5, of which Dr. Engelmann considered it a subspecies.

7. **Q. Prìnus,** L. (CHESTNUT-OAK.) *Leaves* thick, varying, obovate or oblong to lanceolate, sometimes acuminate, *with an obtuse or acute base, undulately crenate-toothed, pale and minutely downy beneath,* the main primary ribs 10 – 16 pairs, straight, prominent beneath; fruiting *peduncles shorter than the petioles, often very short:* cup thick (6 – 12″ wide), mostly tuberculate with hard and stout scales; acorn large (sometimes 1 – 1¼′ long). (Incl. var. monticola, *Michx.*) — Rocky banks and hillsides, E. Mass. to N. Y. and Ont., and south in the mountains to N. Ala. A large tree, with thick and deeply furrowed bark, rich in tannin.

8. **Q. Muhlenbérgii,** Engelm. (YELLOW OAK. CHESTNUT-OAK.) *Leaves* (5 – 7′ long) *slender-petioled, often oblong or even lanceolate, usually acute or pointed, mostly obtuse or roundish at base, almost equably and rather sharply toothed;* cup subsessile, shallow, thin, of small appressed scales, 5 – 7″ broad; acorn globose or obovate, 7 – 9″ long. (Q. Prinus, var. acuminata, *Michx.*) — Dry hillsides and rich bottoms, Mass. to Del., along the mountains to N. Ala., west to Minn., E. Neb., and Tex. — Leaves more like those of the Chestnut than any other; the primary veins very straight, impressed above, prominent beneath. A tall tree, with thin flaky bark.

9. **Q. prinoìdes,** Willd. Like the last, but of *low stature* (usually 2 – 4° high), *with smaller more undulate leaves on shorter petioles* (3 – 6″ long), and deeper cups with *more tumid scales.* (Q. Prinus, var. humilis, *Marsh.*) — Same range as last. Apparently quite distinct at the east, where it is very low, but running into Q. Muhlenbergii at the far west.

* * *Leaves coriaceous, evergreen, entire or rarely spiny-toothed.* — LIVE OAKS.

10. **Q. vìrens,** Ait. (LIVE OAK.) Leaves small, oblong or elliptical, hoary beneath as well as the branchlets; peduncle usually conspicuous, 1 – 3-fruited; cup top-shaped; acorn oblong; cotyledons completely united into one mass. — Along the coast from Va. to Fla. and Tex. Becoming a large tree at the south, and formerly extensively used in ship-building.

§ 2. MELANOBÁLANUS. *Bark dark, furrowed; leaves deciduous, their lobes and teeth acute and bristle-pointed* (*at least in youth*); *stamens mostly* 4 – 6; *cup-scales membranaceous; styles long and spreading; abortive ovules near the top of the perfect seed; inner surface of nut tomentose; fruit maturing the second year, sessile or on short thick peduncles; wood porous and brittle.* — BLACK OAKS.

* *Leaves pinnatifid or lobed, slender-petioled, not coriaceous, the lobes or teeth conspicuously bristle-pointed.*

+– *Mature leaves glabrous on both sides or nearly so, oval, oblong or somewhat obovate in outline, from moderately sinuate-pinnatifid to deeply pinnatifid, turning various shades of red or crimson in late autumn; large trees, with reddish coarse-grained wood; species closely related and apparently readily hybridizing.*

11. **Q. rùbra,** L. (RED OAK.) *Cup saucer-shaped* or flat, with a narrow raised border (9 – 12″ in diameter), of rather fine closely appressed scales, sessile or on a very short and abrupt narrow stalk or neck, *very much shorter than the oblong-ovoid or ellipsoidal acorn,* which is 1′ or less in length; leaves rather thin, turning dark red after frost, moderately (rarely very deeply) pinnatifid, the lobes acuminate from a broad base, with a few coarse teeth; bark of trunk dark gray, smoothish. — Common both in rich and poor soil, westward to E. Minn. and E. Kan. Timber coarse and poor. — Var. RUNCINÀTA, A. DC., is a form with regular nearly entire lobes and the fruit nearly a half smaller; found near St. Louis.

12. **Q. coccínea,** Wang. (SCARLET OAK.) *Cup top-shaped, or hemispherical with a conical base* (7 – 9″ broad), coarsely scaly, covering half or more of the *broadly or globular-ovoid acorn,* the scales somewhat appressed and glabrate, or in western localities yellowish-canescent and squarrose as in var. tinctoria; leaves in the ordinary forms, at least on full-grown trees, bright green, shining above, turning red in autumn, deeply pinnatifid, the slender lobes divergent and sparingly cut-toothed; buds small; acorns 6 – 9″ long; bark of the trunk gray, the interior reddish. — Moist or dry soil; common, from S. Maine to Del., Minn., N. Mo., and south in the mountains.

Var. **tinctòria,** Gray. (QUERCITRON, YELLOW-BARKED, or BLACK OAK.) Leaves with broader undivided lobes, commonly paler and somewhat pubescent beneath, turning brownish, orange, or dull red in autumn; cup-scales large and loosely imbricated or squarrose when dry, yellowish gray, pubescent; bark of trunk darker-colored and rougher on the surface, thicker, and internally orange, much more valuable for the tanner and dyer; buds longer and more pointed; cup sometimes less top-shaped. (Q. tinctoria, *Bartram.*) — Dry or gravelly uplands, S. Maine to S. Minn., E. Neb. and Tex. Intermediate forms connect this with the type. The bark is largely used in tanning.

Var. **ambigua**, Gray. (Gray Oak.) Found along our northeastern borders to Lake Champlain and northward, figured and briefly characterized by Michaux as with the foliage of Q. rubra and the fruit of Q. coccinea. It was considered by Dr. Engelmann as a form of Q. rubra with cups hemispherical or even turbinate.

13. **Q. palústris,** Du Roi. (Swamp Spanish or Pin Oak.) *Cup flat-saucer-shaped,* sometimes contracted into a short scaly base or stalk, fine-scaled (5 – 7″ broad), *very much shorter than the usually globose or depressed acorn,* which is 5 – 7″ long; leaves deeply pinnatifid with divergent lobes and broad rounded sinuses. — Low grounds; rather common, from Mass. to Del. and Md., west to Minn., E. Kan., and Ark.

++ *Mature leaves soft-downy beneath; cup saucer-shaped, with a somewhat top-shaped base, about half the length of the fully developed small acorn.*

14. **Q. falcàta,** Michx. (Spanish Oak.) *Leaves grayish-downy or fulvous underneath,* obtuse or rounded at base, 3 – 5-*lobed above* (sometimes entire); *the lobes prolonged, mostly narrow and more or less scythe-shaped,* especially the terminal one, entire or sparingly cut-toothed; acorn globose, 4 – 5″ long. — Dry or sandy soil, Long Island to Fla., and from S. Ind. to Mo. and Tex. A large or small tree, extremely variable in foliage; bark excellent for tanning.

15. **Q. ilicifòlia,** Wang. (Bear or Black Scrub-Oak.) *Dwarf* (3 – 8° high), straggling; *leaves* (2 – 4′ long) thickish, *obovate, wedge-shaped at base, angularly about* 5- (3 – 7-) *lobed, white-downy beneath;* lobes short and triangular, spreading; acorn ovoid, globular, 5 – 6″ long. — Sandy barrens and rocky hills, N. Eng. to Ohio and Ky.

* * *Leaves entire or with a few teeth* (*or somewhat* 3 – 5-*lobed at the summit*), *coriaceous, commonly bristle-pointed; acorns globular, small* (*not over* 6″ *long*).

+ *Leaves thick, widening or often much dilated upward and more or less sinuate or somewhat* 3 – 5-*lobed; acorns globular-ovoid.*

16. **Q. aquática,** Walter. (Water-Oak.) *Leaves glabrous and shining, obovate-spatulate or narrowly wedge-form, with a long tapering base* and an often obscurely 3-lobed summit, varying to oblanceolate; cup saucer-shaped or hemispherical. — Wet grounds, around ponds, etc., Del. to the Gulf, and from Ky. and Mo. to Tex. — Tree 30 – 40° high; running into many varieties, especially southward; the leaves on seedlings and strong shoots often incised or sinuate-pinnatifid; then mostly bristle-pointed.

17. **Q. nigra,** L. (Black-Jack or Barren Oak.) *Leaves broadly wedge-shaped,* but sometimes rounded or obscurely cordate at the base, *widely dilated* and somewhat 3-lobed (rarely 5-lobed) at the summit, occasionally with one or two lateral conspicuously bristle-tipped lobes or teeth, rusty-pubescent beneath, shining above, large (4 – 9′ long); *cup top-shaped,* coarse-scaly; acorn short-ovoid. — Dry sandy barrens, or heavy clay soil, Long Island to S. Minn., E. Neb., and southward. A small tree (sometimes 30 – 40° high), of little value.

++ *Leaves not dilated upward, generally entire; acorn globose.*

18. **Q. imbricària,** Michx. (Laurel or Shingle Oak.) *Leaves lanceolate-oblong,* thickish, smooth, and *shining above, downy underneath, the down commonly persistent;* cup between saucer-shaped and top-shaped. — Rich woodlands, Penn. to Ga., west to S. Wisc., Iowa, E. Neb., and N. Ark. —

Tree 30–90° high. The specific name is in allusion to its early use for shingles.

19. **Q. Phéllos,** L. (Willow-Oak.) *Leaves linear-lanceolate, narrowed to both ends, soon glabrous,* light green (3–4′ long); cup saucer-shaped. — Bottom lands or rich sandy uplands, Staten Island to N. Fla., west to S. Ky., Mo., and Tex.

In addition to the above, the following hybrids have been recognized: —

Q. alba × macrocarpa; N. Ill. (*Bebb*); central Ill. (*Hall*).
Q. alba × stellata; N. Ill. (*Bebb*); D. C. (*Vasey*); S. C. (*Mellichamp*).
Q. alba × Prinus; near Washington, D. C. (*Vasey*.)
Q. imbricaria × nigra (Q. tridentata, *Engelmann*); S. Ill. (*Engelmann*).
Q. imbricaria × palustris; Mo. (*Engelmann*).
Q. imbricaria × coccinea (Q. Leana, *Nutt.*); Ohio to Mo., and near Washington, D. C.
Q. Phellos × rubra (?) or coccinea (?) (Q. heterophylla, *Michx.*); Staten Island and N. J. to Del. and N. C. (Bartram's Oak.)
Q. Phellos × nigra (Q. Rudkini, *Britt.*); N. J. (*Rudkin*).
Q. ilicifolia × coccinea (?); Uxbridge, Mass. (*Robbins.*)

## 7. CASTÀNEA, Tourn. Chestnut.

Sterile flowers interruptedly clustered in long and naked cylindrical catkins; calyx mostly 6-parted; stamens 8–20; filaments slender; anthers 2-celled. Fertile flowers few, usually 3 together in an ovoid scaly prickly involucre; calyx with a 6-lobed border crowning the 3–7-celled 6–14-ovuled ovary; abortive stamens 5–12; styles linear, exserted, as many as the cells of the ovary; stigmas small. Nuts coriaceous, ovoid, enclosed 2–3 together or solitary in the hard and thick very prickly 4-valved involucre. Cotyledons very thick, somewhat plaited, cohering together, remaining underground in germination. — Leaves strongly straight-veined, undivided. Flowers appearing later than the leaves, cream-color; the catkins axillary near the end of the branches, wholly sterile or the upper ones androgynous with the fertile flowers at the base. (The classical name, from that of a town in Thessaly.)

1. **C. satìva,** Mill., var. **Americàna.** (Chestnut.) A large tree; *leaves oblong-lanceolate, pointed,* serrate with coarse pointed teeth, acute at base, when mature *smooth and green both sides;* nuts 2 or 3 in each involucre, therefore flattened on one or both sides, very sweet. (C. vesca, var., of the Manual.) — Rocky woods and hillsides, S. Maine to Del., along the mountains to N. Ala., and west to S. Mich., S. Ind., and Tenn.

2. **C. pùmila,** Mill. (Chinquapin.) A spreading shrub or small tree; *leaves oblong, acute,* serrate with pointed teeth, *whitened-downy beneath;* involucres small, often spiked; the ovoid pointed nut scarcely half as large as a common chestnut, very sweet, solitary, not flattened. — Rich hillsides and borders of swamps, S. Penn. to Fla., west to S. Ind. and Tex.

## 8. FÀGUS, Tourn. Beech.

Sterile flowers in small heads on drooping peduncles, with deciduous scale-like bracts; calyx bell-shaped, 5–7-cleft; stamens 8–16; filaments slender; anthers 2-celled. Fertile flowers usually in pairs at the apex of a short peduncle, invested by numerous awl-shaped bractlets, the inner coherent at base to form the 4-lobed involucre; calyx-lobes 6, awl-shaped; ovary 3-celled with 2 ovules in each cell; styles 3, thread-like, stigmatic along the inner side. Nuts sharply 3-sided, usually 2 in each urn-shaped and soft-prickly coriaceous involucre, which divides to below the middle into 4 valves. Cotyledons thick, folded and somewhat united; but rising and expanding in germination. — Trees, with a close and smooth ash-gray bark, a light horizontal spray, and undivided strongly straight-veined leaves, which are open and convex in the tapering bud and plaited on the veins. Flowers appearing with the leaves, the yellowish staminate flowers from the lower, the pistillate from the upper axils of the leaves of the season. (The classical Latin name, from *φάγω, to eat*, in allusion to the esculent nuts.)

1. **F. ferrugínea,** Ait. (AMERICAN BEECH.) Tree 75 – 100° high; leaves oblong-ovate, taper-pointed, distinctly and often coarsely toothed; petioles and midrib soon nearly naked; prickles of the fruit mostly recurved or spreading. — N. Scotia to Fla., west to Wisc., E. Ill., Mo., and Tex.

## ORDER 104. SALICÀCEÆ. (WILLOW FAMILY.)

*Diœcious trees or shrubs, with both kinds of flowers in catkins, one to each bract, without perianth; the fruit a* 1*-celled and* 2 – 4*-valved pod, with* 2 – 4 *parietal or basal placentæ, bearing numerous seeds furnished with long silky down.* — Style usually short or none; stigmas 2, often 2-lobed. Seeds ascending, anatropous, without albumen. Cotyledons flattened. — Leaves alternate, undivided, with scale-like and deciduous, or else leaf-like and persistent, stipules. Wood soft and light; bark bitter.

1. **Salix.** Bracts entire. Flowers with small glands; disks none. Stamens few. Stigmas short. Buds with a single scale.
2. **Populus.** Bracts lacerate. Flowers with a broad or cup-shaped disk. Stamens numerous. Stigmas elongated. Buds scaly.

### 1. SÀLIX, Tourn. WILLOW. OSIER. (By M. S. BEBB, Esq.)

Bracts (*scales*) of the catkins entire. Sterile flowers of 3 – 10, mostly 2, distinct or united stamens, accompanied by 1 or 2 small glands. Fertile flowers also with a small flat gland at the base of the ovary; stigmas short. — Trees or shrubs, generally growing along streams, with terete and lithe branches. Leaves mostly long and pointed, entire or glandularly toothed. Buds covered by a single scale, with an inner adherent membrane (separating in n. 14). Catkins appearing before or with the leaves. (The classical Latin name.)

§ 1. *Aments borne on short lateral leafy branchlets; scales yellowish, falling before the capsules mature; filaments hairy below, all free; style very short or obsolete; stigmas thick, notched. Trees or large shrubs; leaves taper-pointed.*

* *Leaves closely serrate with inflexed teeth; capsules glabrous.*

+ *Stamens* 3 – 5 *or more.*

++ *Trees* 15 – 50° *high, with rough bark and slender twigs; no petiolar glands; sterile aments elongated, narrowly cylindrical; flowers somewhat remotely subverticillate; scales entire, short and rounded, crisp-villous on the inside.*

1. **S. nigra,** Marsh. (BLACK WILLOW.) *Leaves narrowly lanceolate, very long-attenuate from near the roundish or acute base to the usually curved tip,*

often downy when young, at length *green and glabrous* except the petiole and midrib; stipules large, semicordate, pointed and persistent, or small, ovoid and deciduous; fruiting aments (1½ – 3′ long) more or less dense; capsules ovate conical, shortly pedicelled. — Banks of streams and lakes, bending over the water; common. — Var. FALCÀTA, Torr. Leaves narrower and scythe-shaped. — Var. WÁRDI, Bebb. Leaves broader, often 1′ wide, glaucous and veined beneath; stipules large, round-reniform; aments long, loosely flowered; capsules globose-conical, long-pedicelled. Rocky islands of the Potomac (*Ward*); Falls of the Ohio (*Short*); Mo. The leaves alone are easily mistaken for those of n. 14. — A hybrid of this species with S. alba, var. vitellina, is found in Wayne Co., N. Y. (*E. L. Hankenson*).

2. **S. amygdaloìdes,** Anders. *Leaves lanceolate or ovate-lanceolate*, 2 – 4′ long, attenuate-cuspidate, *pale or glaucous beneath; petioles long and slender;* stipules minute, very early deciduous; *fertile aments becoming very loose in fruit* from the lengthening of the slender pedicels. — Central N. Y. (*Dudley*) to Mo.; common westward.

++ ++ *A shrub or small bushy tree*, 6 – 15° *high, with smooth bark and rather stout polished twigs; petioles glandular; sterile aments thick, oblong-cylindrical, densely flowered; stamens commonly* 5; *scales dentate, hairy at base, smooth above.*

3. **S. lùcida,** Muhl. (SHINING W.) Leaves ovate-lanceolate or narrower, tapering to a very long acuminate point, at length coriaceous, smooth and shining both sides; stipules small, oblong; fruiting aments often persistent, the capsules becoming rigid and polished, as in the nearly allied S. pentandra of Europe. — Banks of streams, N. Eng. to Penn., west and northward. A beautiful species on account of its showy staminate aments and large glossy leaves.

+- +- *Stamens mostly* 2; *capsules subsessile or very shortly pedicelled; leaves lanceolate, long-acuminate.*

**S.** FRÁGILIS, L. (CRACK WILLOW.) *Leaves green and glabrous*, pale or glaucous beneath, 3 – 6′ long; stipules when present half-cordate; stamens rarely 3 – 4; *capsule long-conical, shortly pedicelled.* — A tall and handsome tree, which was planted at an early day about Boston and elsewhere. — The var. DECÍPIENS, Smith, with yellowish-white or crimson twigs, buds black in winter, and smaller and brighter green leaves, ought perhaps to be excluded, the plant so named by Barratt, etc., being one of the hybrids mentioned below. (Adv. from Eu.)

**S.** ÁLBA, L. (WHITE W.) *Leaves ashy-gray or silky-white on both sides*, except when old, 2 – 4′ long; stipules ovate-lanceolate, deciduous; capsules ovate-conical, sessile or nearly so. — Var. CÆRÙLEA, Koch; twigs olive; old leaves smooth, glaucous beneath, dull bluish green. — Var. VITELLÌNA, Koch; twigs yellow or reddish; old leaves glabrous above. — A familiar tree of rapid growth, attaining a height of 50 – 80°. The typical form, with olive twigs and old leaves silky on both sides, is rarely found with us, but the var. VITELLINA is common. Pure S. FRAGILIS is also scarce, but a host of hybrids between the two, representing S. viridis, *Fries*, S. Russelliana, *Smith*, etc., are the commonest of introduced willows. These forms are rendered almost inextricable by a further cross, by no means rare, with our native S. lucida. (Adv. from Eu.)

**S.** BABYLÓNICA, Tourn. (WEEPING W.) Extensively planted for ornament, and in some places widely spread along river-banks and lake-shores by the drifting of detached limbs. (Adv. from Eu.)

* * *Leaves remotely denticulate with projecting teeth; stamens* 2; *capsule glabrous or silky.*

4. **S. longifòlia,** Muhl. Leaves linear-lanceolate, 2–4′ long, tapering at each end, nearly sessile, more or less silky when young, at length smooth and green both sides; stipules small, lanceolate, deciduous; aments linear-cylindric, often clustered at the ends of the branchlets; capsule shortly pedicelled; stigmas large, sessile. — Found sparingly along the Atlantic coast from Maine to the Potomac; common westward. A shrub, rooting extensively in alluvial deposits and forming dense clumps. This species is a peculiar American type, and exceedingly variable; the earliest leaves after germination pinnately lobed.

§ 2. *Aments lateral or terminal, with or without bracts; scales persistent, colored at the tip; stamens* 2 (*usually* 1 *in* n. 19), *with glabrous filaments* (*united and hairy in* S. purpurea); *shrubs or small trees.*

* *Capsules tomentose.*

+ *Pedicels* 3–6 *times the length of the gland; style medium or none.*

++ *Large shrubs or small trees* (8–15° *high*); *leaves obovate or elliptic-lanceolate,* 2–4′ *long, acute or acuminate, more or less obscurely and irregularly serrate, thin becoming rigid, glaucous beneath; fertile aments oblong-cylindric,* 2–3′ *long, loosely flowered.*

5. **S. rostràta,** Richardson. *Leaves dull green and downy above,* stoutly veined and *soft-hairy beneath,* serrate, crenate or subentire; stipules when present semi-cordate, toothed, acute; *aments appearing with the leaves,* the sterile narrowed at base, pale yellow; capsules tapering to a very long slender beak; *pedicels thread-like, much exceeding the pale, rose-tipped, linear, thinly villous scales;* style scarcely any; stigma-lobes entire or deeply parted. (S. livida, var. occidentalis, *Gray.*) — Moist or dry ground, N. Eng. to Penn., and far west and northward. Not spreading from the root but having rather the habit of a small tree, with a distinct trunk.

6. **S. díscolor,** Muhl. (GLAUCOUS W.) *Leaves smooth and bright green above, soon smooth beneath,* irregularly crenate-serrate, the serratures remote at base, closer, finer and becoming obsolete toward the point; stipules ½′ long or more, and sharply toothed, or small and nearly entire; *aments closely sessile, thick, oblong-cylindrical,* 1′ long or more, *appearing before the leaves* in earliest spring; *scales dark red or brown, becoming black, copiously clothed with long glossy hairs;* style short but distinct. — Var. ERIOCÉPHALA, Anders. Aments more densely flowered and more silvery silky; leaves sometimes retaining a ferruginous pubescence beneath even when fully grown. — Var. PRINOÌDES, Anders. Aments more loosely flowered, less silky; capsules more thinly tomentose; style longer; stigma-lobes laciniate; leaves narrower. (S. prinoides, *Pursh.*) Includes narrow-leaved forms of the type, and others which are probably hybrids with S. cordata. — Low meadows and river-banks, common. The just expanding leaves are often overspread with evanescent ferruginous hairs.

++ ++ *Upland grayish shrubs,* 1–8° *high; leaves oblanceolate, pointed, the lowest obtuse, downy above becoming glabrate, beneath glaucous, rugose-veined and softly tomentose, the margin revolute, undulate-entire; aments ovoid or* *oblong, closely sessile, appearing before the leaves, naked at base; capsules rather shortly pedicelled, greenish or reddish, spreading; scales dark red or brownish; style distinct; stigmas bifid.*

7. **S. hùmilis,** Marsh. (PRAIRIE W.) *Leaves oblanceolate or oblong-lanceolate,* the lowest obovate; *stipules medium-sized,* semi-ovate, entire or oftener toothed; *petioles distinct;* aments often recurved, about 1′ long. — Dry plains and barrens, common. A shrub, 3 – 8° high, varying much in the size and shape of the leaves. Hybrids with n. 6 have equally broad and large but duller green leaves, softly tomentose beneath and with shorter petioles, the aments equally thick but usually recurved, and the capsules on shorter pedicels. Small forms apparently pass into the next.

8. **S. trístis,** Ait. (DWARF GRAY W.) *Leaves small* (1 – 2′ long), *crowded, linear-oblanceolate,* tapering to a *very short petiole; stipules minute, deciduous;* aments very small, globular or oval, about ½′ long in fruit. — Sandy plains or on the borders of hillside thickets, common. A tufted shrub, 1 – 1½° high, rising from a strong large root.

++ ++ ++ *Low shrubs, 3 – 10° high, of cold swamps, with slender yellowish or reddish twigs; leaves lanceolate, smooth above, glaucous beneath and covered when young with appressed silvery-silky hairs; aments (especially the fertile) with a few leafy bracts at base; capsule pedicelled, silvery-silky; stigmas bifid.*

= *Shrubs of lowland swamps; leaves narrowly lanceolate, 2 – 3′ long, taper-pointed, finely and evenly serrate; stipules linear or semi-cordate, deciduous; aments sessile or in fruit slightly peduncled; style very short.*

9. **S. serícea,** Marsh. (SILKY W.) Leaves at first (principally beneath) very silky, turning black in drying; aments narrowly cylindrical, the fertile densely flowered; capsule short-pedicelled, ovate-oblong, rather obtuse. — Common, but more prevalent from the region of the Great Lakes eastward.

10. **S. petiolàris,** Smith. Leaves only slightly silky when young, soon smooth, with less tendency to blacken in drying; fertile aments ovoid-cylindric, in fruit broad and loose from the lengthening of the pedicels; capsule rostrate from an ovate base, rather acute. — Var. GRÁCILIS, Anders., has extremely loose aments, and very long-pedicelled attenuate-rostrate capsules. — Common, but more prevalent from the Great Lakes westward. This species, like the preceding, hybridizes freely with S. cordata.

= = *Alpine shrub; leaves 1 – 2′ long, repand-crenate; stipules minute, fugacious; aments leafy-peduncled; style distinct.*

11. **S. argyrocárpa,** Anders. Leaves tapering evenly to both ends, acute, or the earliest obovate and obtuse, at length rigid, the margin slightly revolute; petiole short; fruiting ament short (about 1′ long), loosely flowered; capsule tapering, densely silky-silvery; gland of the staminate flower variously doubled. — Moist alpine ravines in a few limited localities on or near Mt. Washington, N. H.; also in Lower Canada and Lab. A bushy branched shrub, erect or depressed at base, 1 – 2° high, growing in wide dense patches. A hybrid with n. 13 was detected by Mr. *E. Faxon* in Tuckerman's ravine (its leaves collected by Dr. Gray as early as 1842!), appearing like a large form of the species with the aments of S. phylicifolia.

+- +- *Pedicels twice the length of the gland; style elongated.*

12. **S. cándida,** Willd. (SAGE W. HOARY W.) Leaves lanceolate or linear-lanceolate, 2 – 4′ long, taper-pointed or the lowest obtuse, rather rigid, downy above, becoming glabrate, *beneath covered with a dense white tomentum,* the revolute margin subentire; *stipules lanceolate, about as long as the petioles;* aments cylindrical, densely flowered, 2′ long in fruit; anthers red; the dark gland elongated; capsule densely white-woolly; style dark red; stigmas short, spreading, notched. — Cold bogs, N. Eng. and N. J. to Iowa, and northward. — A hoary shrub 2 – 5° high; young shoots white-woolly, the older red. Two beautiful hybrids, with n. 10 and n. 14, have been found near Flint, Mich. (*Dr. Clarke*).

13. **S. phylicifòlia,** L. Leaves lanceolate, ovate-lanceolate or elliptic, somewhat equally pointed or obtuse at both ends, remotely and minutely repand-toothed, 2 – 3′ long, *very smooth on both sides*, dark green and shining above, glaucous beneath, at length coriaceous; *stipules obsolete;* aments sessile with a few small bracts at base, 1′ long, rather densely flowered, oblong-cylindric, the fertile somewhat stipitate, becoming 2′ long in fruit; scales dark, silky-villous; capsule conic-rostrate from an ovoid base; stigmas bifid or entire, yellow drying black. (S. chlorophylla, of *Man.;* S. chlorophylla, var. denudata, *Anders.*) — Moist ravines on alpine summits of the White Mountains, and of Mt. Mansfield, Vt. — A divaricately much branched shrub 1 – 10° high; twigs glabrous, sometimes covered with a glaucous bloom. (Eu.)

**S.** VIMINÀLIS, L., the OSIER WILLOW of Europe, is occasionally planted, but soon dies out. Some of its hybrids, as S. SMITHIÀNA, Willd., etc., stand our climate better, but cannot be regarded as adventive.

+- +- +- *Capsules sessile; filaments and often the reddish anthers united so as to appear as one.*

**S.** PURPÙREA, L. (PURPLE W.) Leaves oblanceolate or tongue-shaped, slightly serrulate, very smooth, glaucescent, subopposite; stipules obsolete; aments densely flowered, narrow-cylindrical, the sterile at least closely sessile, with only very small bracts at base; scale small, round, crisp-villous, tipped with dark purple; capsules grayish-tomentose, ovate-conical, obtuse. — Low grounds; commonly cultivated for basket-rods. (Adv. from Eu.)

* * *Capsules glabrous.*

+- *Tall shrubs,* 4 – 10° *high; leaves lanceolate or ovate-lanceolate,* 2 – 4′ *long, acute or acuminate (on vigorous shoots rounded, truncate or cordate at base), serrate; sterile aments very silky, with a few bracts at base,* 1′ *long or more, the fertile leafy-peduncled, in fruit* 2′ *long or more; capsules tapering, pointed.*

++ *Leaves soon smooth; capsules long-pedicelled; style medium.*

14. **S. cordàta,** Muhl. (HEART-LEAVED W.) *Leaves oblong-lanceolate or narrower*, on the flowering branches often tapering at base, sharply serrate, finely denticulate or subentire, *green both sides or scarcely paler beneath*, the young often silky or downy, especially on the midrib, not turning black in drying; stipules reniform or ovate, serrate, usually large and conspicuous; *aments rather slender;* capsules greenish or rufescent, 2 – 3″ long. (S. rigida, *Muhl.*) — Var. ANGUSTÀTA, Anders. Leaves narrower, gradually acuminate, finely serrate. — In wet places and along streams, etc.; our most widely distributed and variable species. — S. MYRICOÌDES, Muhl. (S. cordata, var. myri-

coides, *Darl.*, Fl. Cestr., 3 ed.), is a hybrid between this species and S. sericea, having the leaves, even those of the most vigorous shoots, tapering and rather acute at base, glaucous or glaucescent beneath and sparsely appressed-hairy; stipules small, ovate, pointed; capsules more or less silky when young, becoming glabrate, shortly pedicelled; twigs brittle at base. A hybrid with the European S. incana (surprising on account of the rarity of the cultivated parent) is found at Ithaca, N. Y. (*Dudley*).

15. **S. glaucophýlla,** Bebb. *Leaves varying from ovate with a broadly rounded base to oblong-lanceolate* and equally pointed at both ends (3 – 4′ long, nearly 2′ wide), glandular-serrate, *subcoriaceous, glabrous throughout, dark green and shining above, glaucous beneath*, the young drying black; stipules large, ear-shaped, dentate; *aments thick, oblong-cylindrical*, in size and silkiness resembling n. 6; capsules attenuate-rostrate, 3 – 5′ long, greenish, drying brown. — Var. ANGUSTIFÒLIA, Bebb; leaves narrower (3′ long, ¾′ wide), pointed at both ends. (S. angustata, of ed. 2, in part.) — Var. BREVIFÒLIA, Bebb; leaves obovate, about 1′ long, strongly veined. — Common on the sand dunes of Lake Michigan, and occasionally found away from the lake-shore in N. Ill and Wisc.

16. **S. balsamífera,** Barratt. *Leaves broadly rounded and usually subcordate at base, at first very thin, subpellucid* and of a rich reddish color, *at length rigid, dark green above, paler or glaucous and prominently reticulate-veined beneath*, slightly glandular-serrulate; petioles long and slender; *stipules obsolete; fertile aments becoming very lax in fruit*, the long slender pedicels 6 – 8 times the length of the gland; style short. (S. pyrifolia, *Anders.*) — In open swamps along our northern boundary, Maine to Minn., and northward; White Mountains of N. H. (*Little*, 1823; rediscovered by *Pringle*, and *C. E.* and *E. Faxon*). A much branched shrub, growing in clumps; recent twigs shining-chestnut on the sunny side.

++ ++ *Leaves clothed, even when fully grown, with a long silky tomentum on both sides, which is finally deciduous; capsule subsessile; style elongated.*

17. **S. adenophýlla,** Hook. Leaves ovate or very broadly lanceolate, cuspidate-acuminate (1 – 2′ long), dull green both sides, very closely serrate with fine projecting gland-tipped teeth; stipules conspicuous, ovate-cordate, glandular-serrate, exceeding the short stout petioles, which are dilated at base and embrace the obtuse silky buds; aments leafy-peduncled, the fertile not rarely becoming 4′ long, densely flowered. — Shores of the Great Lakes, rooting extensively in the sand-dunes. A large straggling shrub, with stout tomentose twigs and crowded leaves. Hybridizes with S. cordata.

+ + *Low erect shrub*, 1 – 3° *high; leaves small, entire; capsules oblong-cylindric; stigmas sessile or nearly so.*

18. **S. myrtilloides,** L. Leaves elliptic-obovate, about 1′ long, obtuse or somewhat pointed, entire, smooth on both sides, somewhat coriaceous when mature, revolute, reticulated, pale or glaucous beneath; fertile aments oblong, loosely few-flowered, borne on long leafy peduncles; capsules reddish green; pedicels slender, twice the length of the nearly smooth greenish yellow scale. — Var. PEDICELLÀRIS, Anders.; leaves oblong-linear or oblanceolate, 1 – 2½′ long. — Cold peat-bogs, N. Eng. and N. J. to Iowa, and northward. (Eu.)

+ + + *Prostrate or creeping and matted alpine shrubs.*

19. **S. Uva-úrsi,** Pursh. (Bearberry W.) *Leaves elliptical* and pointed, or obovate and obtuse, less than 1′ long, 3 – 4″ wide, tapering at base, slightly toothed, strongly veined, smooth and shining above, pale and rather glaucous beneath; *aments borne on slender lateral leafy peduncles, oblong-cylindric,* 6 – 9″ long, the fertile lengthening to 2′ and narrowly cylindric, *densely flowered* above, often loose below; *scales* obovate, rose-red at the tip, *covered with long silky hairs;* stamens rarely 2; capsule ovate-conical, brownish at maturity; pedicel scarcely exceeding the gland; style distinct. (S. Cutleri, *Tuckerm.*) — Abundant over all the alpine summits of N. New Eng. and N. Y. Closely prostrate, spreading from a stout central root over an area 1 – 2° in diameter.

20. **S. herbàcea,** L. *Leaves roundish oval,* heart-shaped, obtuse or retuse, less than 1′ long, serrate, smooth and shining, reticulately veined; *aments terminating 2-leaved branchlets, small, ovoid,* 4 – 10 *flowered; scales* concave, obovate, obtuse, *glabrous* or slightly pubescent; capsule subsessile. — Alpine summits of the White Mountains, and far northward. A very small herb-like species, the half-underground stems creeping and rooting to a considerable extent, the branches seldom rising above 1 - 2′ from the ground. (Eu.)

## 2. PÓPULUS, Tourn. Poplar. Aspen.

Bracts (*scales*) of the catkins irregularly cut-lobed at the apex. Flowers from a cup shaped disk which is obliquely lengthened in front. Stamens 8 – 30, or more; filaments distinct. Stigmas 2 – 4, elongated. Capsules 2 – 4-valved. — Trees, with broad and more or less heart-shaped or ovate toothed leaves, and often angular branches. Buds scaly, covered with resinous varnish. Catkins long and drooping, appearing before the leaves. (The classical Latin name, of uncertain origin.)

§ 1. *Styles* 2, *with* 2 – 3 *narrow or filiform lobes; capsules thin, oblong-conical, 2-valved; seeds very small; leaves ovate.*

* *Petioles laterally flattened; bracts silky; stamens* 6 – 20; *capsules numerous, small, on very short pedicels.*

**P. álba,** L. (White Poplar. Abele.) The younger branches and the under surface of the rhombic-oval sinuate-toothed acute leaves white-tomentose; scales crenate, fringed. — Frequently cultivated for shade, spreading widely by the root, and occasionally spontaneous. (Adv. from Eu.)

1. **P. tremuloìdes,** Michx. (American Aspen.) Small tree 20 – 50° high, with smooth greenish-white bark; *leaves roundish-heart-shaped,* with a short sharp point, and *small somewhat regular teeth,* smooth on both sides, with downy margins, on long slender petioles; *scales cut into* 3 – 4 *deep linear divisions,* fringed with long hairs. — Maine to the mountains of Penn., N. Ky., Minn., and far north and westward.

2. **P. grandidentàta,** Michx. (Large-toothed Aspen.) Tree 60 – 75° high, with smoothish gray bark; *leaves roundish-ovate, with large and irregular sinuate teeth,* when young densely covered with white silky wool, at length smooth both sides; *scales cut into* 5 – 6 *unequal small divisions,* slightly fringed. — Rich woods and borders of streams, N. Scotia to the mountains of N. C., west to N. Minn. and Tenn.

* * *Petioles terete; bracts not silky; stamens* 12 – 60.

3. **P. heterophýlla,** L. (Downy Poplar.) Tree 40 – 80° high; leaves ovate with a somewhat truncate or cordate base, obtuse, crenate, white-woolly when young, at length nearly smooth, except on the elevated veins beneath; fertile catkins few-flowered; capsules ½′ long, equalling the pedicels. — Borders of river swamps, Conn. to Ga., and in the west from S. Ind. and Ill. to Ark. and W. La.

§ 2. *Styles* 2 – 4, *with dilated lobes; capsules large, often thick, subglobose to ovate-oblong,* 2 – 4-*valved: bracts mostly glabrous; seeds* 1 – 2″ *long.*

4. **P. balsamífera,** L. (Balsam Poplar. Tacamahac.) Tree 50 – 75° high, the large buds varnished with a copious fragrant resin; *leaves ovate-lanceolate, gradually tapering and pointed,* finely crenate, smooth on both sides, whitish and reticulately veined beneath, on terete petioles ½ – 2′ long; scales dilated, slightly hairy; *stamens* 20 – 30; *capsule ovate,* 2-*valved.* — Borders of rivers and swamps, N. New Eng. to Mich. and Minn., and far north and westward. — Var. cándicans, Gray. (Balm of Gilead.) *Leaves broader and more or less heart-shaped;* petiole commonly hairy. Common in cultivation, but rare or unknown in a wild state.

5. **P. monilífera,** Ait. (Cotton-wood. Necklace Poplar.) Tree 75 – 150° high; *leaves broadly deltoid,* with numerous crenate serratures and narrow very acute acumination, sometimes ovate, rarely cordate, on elongated flattened petioles; scales lacerate-fringed, not hairy; *stamens* 60 *or more; capsules* on slender pedicels (4 – 5″ long) in long catkins, *oblong-ovate,* 3 – 4-*valved.* (Incl. P. angulata, *Ait.*) — Borders of streams, western N. Eng. to Fla., west to the Rocky Mts.

## Order 105. EMPETRÀCEÆ. (Crowberry Family.)

*Low shrubby evergreens, with the foliage, aspect, and compound pollen of* Heaths, *and the drupaceous fruit of* Arctostaphylos, but the divided or laciniate stigmas, etc., of some Euphorbiaceæ; — probably only an apetalous and polygamous or diœcious degenerate form of Ericaceæ, — comprising three genera, two of which occur within the limits of this work, and the third farther south.

1. **Empetrum.** Flowers scattered and solitary in the axils. Sepals 3, somewhat petal-like.
2. **Corema.** Flowers collected in terminal heads. Calyx none.

### 1. ÉMPETRUM, Tourn. Crowberry.

Flowers polygamous, scattered and solitary in the axils of the leaves (inconspicuous), scaly-bracted. Calyx of 3 spreading and somewhat petal-like sepals. Stamens 3. Style very short; stigma 6 – 9-rayed. Fruit a berry-like drupe, with 6 – 9 seed-like nutlets, each containing an erect anatropous seed. Embryo terete, in the axis of copious albumen, with a slender inferior radicle and very small cotyledons. (An ancient name, from ἐν, *upon*, and πέτρος, *a rock*.)

1. **E. nigrum,** L. (Black Crowberry.) Procumbent and spreading; leaves linear-oblong, scattered; fruit black. — Newf., Mount Desert and

adjacent coast of Maine, alpine summits in N. Eng. and N. Y., L. Superior, and northward. (Eu.)

### 2. CORÈMA, Don. BROOM-CROWBERRY.

Flowers diœcious or polygamous, collected in terminal heads, each in the axil of a scaly bract, and with 5 or 6 thin and scarious imbricated bractlets, but no proper calyx. Stamens 3, rarely 4, with long filaments. Style slender, 3- (or rarely 4–5-) cleft; stigmas narrow, often toothed. Drupe small, with 3 (rarely 4–5) nutlets. Seed, etc., as in the last. — Diffusely much-branched little shrubs, with scattered or nearly whorled narrowly linear heath-like leaves. (Name *κόρημα*, *a broom*, from the bushy aspect.)

1. **C. Conrádii,** Torr. Shrub 6′–2° high, diffusely branched, nearly smooth; drupe very small, dry and juiceless when ripe. — Sandy pine barrens and dry rocky places, N. J. and L. Island (?), Shawangunk Mts., N. Y., coast of S. E. Mass. and Maine, to Newf. The sterile plant is handsome in flower, on account of the tufted purple filaments and brown-purple anthers.

## ORDER 106. CERATOPHYLLÀCEÆ. (HORNWORT FAMILY.)

*Aquatic herbs, with whorled finely dissected leaves, and minute axillary and sessile monœcious flowers without floral envelopes, but with an* 8–12-*cleft involucre in place of a calyx, the fertile a simple* 1-*celled ovary, with a suspended orthotropous ovule; seed filled by a highly developed embryo with a very short radicle, thick oval cotyledons, and a plumule consisting of several nodes and leaves.* — Consists only of the genus

### 1. CERATOPHÝLLUM. L. HORNWORT.

Sterile flowers of 10–20 stamens, with large sessile anthers. **Fruit** an achene, beaked with the slender persistent style. — Herbs growing under water, in ponds or slow-flowing streams; the sessile leaves cut into thrice-forked thread-like rigid divisions (whence the name from *κέρας*, *a horn*, and *φύλλον*, *leaf*).

1. **C. demérsum,** L. Fruit smooth, marginless, beaked with a long persistent style, and with a short spine or tubercle at the base on each side. — Var. ECHINÀTUM, Gray, has the fruit mostly larger (3″ long), rough-pimpled on the sides, the narrowly winged margin spiny-toothed. — Slow streams and ponds, across the continent. (Eu., etc.)

## SUBCLASS II. GYMNOSPÉRMÆ.

Pistil represented by an open scale or leaf, or else entirely wanting; the ovules and seeds therefore naked (without a pericarp), and fertilized by the direct application of the pollen. Cotyledons often more than two.

### ORDER 107. CONÍFERÆ. (PINE FAMILY.)

*Trees or shrubs, with resinous juice, mostly awl-shaped or needle-shaped entire leaves, and monœcious or rarely diœcious flowers in catkins or solitary, destitute of calyx or corolla.* Ovules orthotropous or inverted. Embryo in the axis of the albumen, nearly its length. (Wood destitute of ducts, composed chiefly of a homogeneous large woody fibre which is marked with circular disks on two sides.)

SUBORDER I. **Pinàceæ.** Fertile flowers in scaly aments becoming cones or berry-like. Ovules 2 or more at the base of each scale. Mostly monœcious and evergreen.

**Tribe I. ABIETINEÆ.** (PINE FAMILY proper.) Fertile flowers in catkins, consisting of numerous open spirally imbricated carpels in the form of scales, each scale in the axil of a thin persistent bract; in fruit forming a strobile or cone. Ovules 2, adherent to the base of each scale, inverted. Seeds winged. Cotyledons 3 - 16. Anthers spirally arranged upon the stamineal column, which is subtended by involucral scales. Buds scaly. Leaves scattered (or fascicled in n. 1 and 5), linear to needle-shaped.

* Cones maturing the second year, their scales becoming thickened and corky.

1. **Pinus.** Leaves 2 - 5 in a cluster, surrounded by a sheath of scarious bud-scales.

* * Cones maturing the first year, their scales remaining thin.

+ Cones pendulous, their scales persistent; bracts smaller than the scales; leaves jointed upon a prominent persistent base, solitary.

2. **Picea.** Leaves sessile, keeled on both sides (tetragonal).
3. **Tsuga.** Leaves petioled, flat.

+ + Cones erect; bracts longer than the scales; leaf-scars not prominent.

4. **Abies.** Scales of the large cone deciduous. Leaves persistent, solitary, keeled beneath.
5. **Larix.** Scales of the small cone persistent. Leaves mostly fascicled, flat, deciduous.

**Tribe II. TAXODIEÆ.** Fertile aments of several spirally arranged imbricated scales, without bracts, becoming a globular woody cone. Ovules 2 or more at the base of each scale, erect. Leaves linear, alternate; leaf-buds not scaly.

6. **Taxodium.** Seeds 2 to each scale. Leaves 2-ranked, deciduous.

**Tribe III. CUPRESSINEÆ.** Scales of the fertile ament few, decussately opposite or ternate, becoming a small closed cone or sort of drupe. Ovules 2 or more in their axils, erect. Cotyledons 2 (rarely more) Leaves decussately opposite or ternate, usually scale-like and adnate, the earlier free and subulate; leaf-buds not scaly.

* Monœcious; fruit a small cone; leaves opposite and foliage more or less 2-ranked.

7. **Chamæcyparis.** Cone globose; scales peltate. Seeds 1 or 2, narrowly winged.
8. **Thuya.** Cone pendulous, oblong, of 8 - 12 imbricated scales. Seeds 2, 2-winged.

* * Diœcious. Fruit berry-like, with bony ovate seeds.

9. **Juniperus.** Fruit-scales 3 - 6, coalescent. Foliage not 2-ranked.

SUBORDER II. **Taxàceæ.** (YEW FAMILY.) Flowers diœcious, axillary and solitary, the fertile consisting of a naked erect ovule which becomes a bony-coated seed more or less surrounded or enclosed by the enlarged fleshy disk (or scale).

10. **Taxus.** Leaves linear, scattered. Seed surrounded by a red berry-like cup.

## 1. PÌNUS, Tourn. PINE.

Sterile flower at the base of the shoot of the same spring, involucrate by a nearly definite number of scales, consisting of numerous stamens spirally inserted on the axis, with very short filaments and a scale-like connective; anther-cells 2, opening lengthwise. Pollen of 3 united cells, the 2 lateral ones empty. Fertile catkins solitary or aggregated immediately below the terminal bud, or lateral on the young shoot, consisting of imbricated carpellary scales, each in the axil of a persistent bract, bearing a pair of inverted ovules at the base. Fruit a cone formed of the imbricated woody carpellary scales, which are thickened at the apex (except in White Pines), persistent, spreading when ripe and dry; the 2 nut-like seeds partly sunk in excavations at the base of the scale; in separating carrying away a part of its lining as a thin fragile wing. Cotyledons 3 – 12, linear. — Primary leaves thin and chaff-like, merely bud-scales; from their axils immediately proceed the secondary needle-shaped evergreen leaves, in fascicles of 2 to 5, from slender buds, some thin scarious bud-scales sheathing the base of the cluster. Leaves when in pairs semicylindrical, becoming channelled; when more than 2 triangular; their edges in our species serrulate. Blossoms developed in spring; the cones maturing in the second autumn. (The classical Latin name.)

§ 1. *Leaves 5, each with a single fibro-vascular bundle; sheath loose, deciduous; cones subterminal, their scales but slightly thickened at the end and without prickle or point; bark smooth except on old trunks.*

1. **P. Stróbus,** L. (WHITE PINE.) Tree 75 – 160° high; leaves very slender, glaucous; sterile flowers oval (4 – 5″ long), with 6 – 8 involucral scales at base; fertile catkins long-stalked, cylindrical; cones narrow, cylindrical, nodding, often curved (4 – 6′ long); seed smooth; cotyledons 8 – 10. — Newf. to Penn., along the mountains to Ga., west to Minn. and E. Iowa. Invaluable for its soft, light, white or yellowish wood, in large trees nearly free from resin.

§ 2. *Leaves in twos or threes, each with two fibro-vascular bundles; sheath close; woody scales of the cones thickened at the end and usually spiny-tipped.*

* *Cones lateral; their scales much thickened at the end; leaves rigid.*

+ *Leaves in threes (rarely in twos in* n. 2).

2. **P. Tæda,** L. (LOBLOLLY OR OLD-FIELD PINE.) *Leaves long* (6 – 10′) *with elongated sheaths,* light green; cones elongated-oblong (3 – 5′ long) and tapering; *scales tipped with a stout incurved spine.* — Wet clay or dry sandy soil, Del. to Fla. near the coast, thence to Tex. and Ark. — A tree 50 – 150° high; staminate flowers slender, 2′ long, with usually 10 – 13 involucral scales; seeds with 3 strong rough ridges on the under side.

3. **P. rígida,** Mill. (PITCH PINE.) *Leaves* (3 – 5′ long) dark green, *from short sheaths;* cones ovoid-conical or ovate (1 – 3½′ long), often in clusters; *scales with a short stout recurved prickle.* — Sandy or barren soil, N. Brunswick

to N. Ga., western N. Y. and E. Ky. — A tree 30 – 80° high, with very rough dark bark and hard resinous wood; sterile flowers shorter; scales 6 – 8.

+ + *Leaves in twos* (*some in threes in* n. 4 *and* 7).

4. **P. púngens,** Michx. f. (Table Mountain Pine.) *Leaves stout, short* (1¼ – 2½′ long), crowded, bluish, the sheath short (very short on old foliage); cones ovate (3½′ long), *the scales armed with a strong hooked spine* (¼′ long). — Alleghany Mts., Penn., to N. C. and Tenn. — A rather small tree (20 – 60° high); cones long-persistent.

5. **P. ínops,** Ait. (Jersey or Scrub Pine.) *Leaves short* (1½ – 3′ long); cones oblong-conical, sometimes curved (2 – 3′ long), the *scales tipped with a straight or recurved awl-shaped prickle.* — Barrens and sterile hills, Long Island to S. C., mostly near the coast, west through Ky. to S. Ind. — A straggling tree at the east, 15 – 40° high, with spreading or drooping branchlets; larger westward. Young shoots with a purplish glaucous bloom.

6. **P. Banksiàna,** Lambert. (Gray or Northern Scrub Pine.) *Leaves short* (1′ long), *oblique, divergent;* cones conical, oblong, usually curved (1½ – 2′ long), smooth, the *scales pointless.* — Barren sandy soil, S. Maine and N. Vt. to S. Mich., central Minn., and northward. Straggling shrub or low tree.

7. **P. mìtis,** Michx. (Yellow Pine.) *Leaves* sometimes in threes, *from long sheaths, slender* (3 – 5′ long); cones ovate- or oblong conical (barely 2′ long), the *scales with a minute weak prickle.* — Usually dry or sandy soil, Staten Island to Fla., S. Ind., S. E. Kan. and Tex. — A straight tree, 50 – 100° high, with dark green leaves more soft and slender than the preceding. The western form has more rigid leaves and more tuberculate and spiny cones.

* * *Cones terminal; leaves long and slender, in twos or threes.*

8. **P. resinòsa,** Ait. (Red Pine.) Leaves *in twos* from long sheaths, elongated (5 – 6′ *long*), dark green; cones ovate-conical, smooth (*about* 2′ *long*), *their scales slightly thickened, pointless;* sterile flowers oblong-linear (6 – 9″ long), subtended by about 6 involucral scales which are early deciduous by an articulation above the base. — Dry woods, Mass. to N. Penn., Mich., and Minn., and northward. — A tall tree, with reddish, rather smooth bark and hard wood, not very resinous.

9. **P. palústris,** Mill. (Long-leaved, Yellow, or Georgia Pine.) Leaves *in threes* from long sheaths, *very long* (10 – 15′), crowded at the summit of very scaly branches; sterile flowers 2½ – 3′ long, rose-purple; *cones large,* cylindrical or conical-oblong (6 – 10′ *long*), *the thick scales armed with a short recurved spine.* (P. australis, *Michx.*) — Sandy soil, S. Va. to Fla. and Tex. A large tree, with thin-scaled bark and exceedingly hard and resinous wood.

### 2. PÌCEA, Link. Spruce.

Sterile flowers axillary (or sometimes terminal) on branchlets of the preceding year; anthers tipped with a rounded recurved appendage, their cells opening lengthwise. Fertile catkins and cones terminal; cones maturing the first year, pendulous; their scales thin, not thickened nor prickly-tipped, persistent. Leaves scattered, needle-shaped and keeled above and below (4-sided), pointing every way. Otherwise nearly as in Pinus. (The classical Latin name.)

1. **P. nigra,** Link. (Black Spruce.) *Branchlets pubescent;* leaves short (usually 4 – 8″ long), either dark green or glaucous-whitish; *cones ovate or ovate-*

*oblong* (10 – 20″ long), *mostly recurved, persistent*, the *rigid scales* with a thin denticulate edge. (Abies nigra, *Poir.*) — Swamps and cold mountain woods, New Eng. to Penn., central Mich., Minn., and northward, and south in the mountains to Ga. A tree 40 – 70° high. — Var. RÙBRA, Engelm. Leaves larger and darker; cones larger, bright red-brown, more readily deciduous.

2. **P. álba,** Link. (WHITE SPRUCE.) *Branchlets glabrous;* leaves more slender, pale or glaucous; *cones nodding, cylindrical* (about 2′ long), pale, *deciduous*, the thinner scales with an entire edge. (Abies alba, *Michx.*) — Northern New Eng. and N. Y. to L. Superior, and northward. — A handsomer tree than n. 1, 50 – 150° high, in aspect more like a Balsam Fir.

### 3. TSÙGA, Carrière. HEMLOCK.

Sterile flowers a subglobose cluster of stamens, from the axils of last year's leaves, the long stipe surrounded by numerous bud-scales; anthers tipped with a short spur or knob, their confluent cells opening transversely; pollen-grains simple. Fertile catkins and cones on the end of last year's branchlets; cones maturing the first year, pendulous; their scales thin, persistent. Leaves scattered, flat, whitened beneath, appearing 2-ranked. (The Japanese name of one of the species.)

1. **T. Canadénsis,** Carr. Leaves petioled, short-linear, obtuse (½′ long); cones oval (6 – 8″ long), of few thin scales much longer than the bracts. (Abies Canadensis, *Michx.*) — Mostly hilly or rocky woods, N. Scotia to Del., and along the mountains to Ala., west to Mich. and Minn. — A tall tree, with light and spreading spray and delicate foliage, bright green above, silvery beneath.

### 4. ÀBIES, Link. FIR.

Sterile flowers from the axils of last year's leaves; anthers tipped with a knob, their cells bursting transversely; pollen as in Pinus. Fertile catkins and cones erect on the upper side of spreading branches; cones maturing the first year; their thin scales and mostly exserted bracts deciduous at maturity. Seeds and bark with balsam-bearing vesicles. Leaves scattered, sessile, flat, with the midrib prominent on the whitened lower surface, on horizontal branches appearing 2-ranked. (The classical Latin name.)

1. **A. balsàmea,** Miller. (BALSAM or BALM-OF-GILEAD FIR.) Leaves narrowly linear (6 – 10″ long); *cones cylindrical* (2 – 4′ long, 1′ thick), violet-colored; *the bracts obovate*, serrulate, tipped with an abrupt slender point, *shorter than the scales.* — Damp woods and mountain swamps, Newf. to Penn., along the mountains to Va., west to Minn., and northward. A slender tree or at high elevations a low or prostrate shrub.

### 5. LÀRIX, Tourn. LARCH.

Catkins lateral, terminating short spurs on branches of a year's growth or more, short or globular, developed in early spring; the sterile from leafless buds; the fertile mostly with leaves below. Anther-cells opening transversely. Pollen-grains simple, globular. Cones as in Spruce, the scales persistent. — Leaves needle-shaped, soft, deciduous, all foliaceous, very many in a fascicle developed in early spring from lateral scaly and globular buds, and scattered along the developed shoots of the season. Fertile catkins crimson or red in flower. (The ancient name.)

1. **L. Americàna,** Michx. (AMERICAN or BLACK LARCH. TAMARACK. HACKMATACK.) Leaves short; cones ovoid (6 – 9″ long), of few rounded scales, arranged in $\frac{2}{5}$ order. — Chiefly in cold swamps, N. Penn. to N. Ind. and central Minn., and far northward. A slender tree, 30 – 100° high, with hard and very resinous wood.

### 6. TAXÒDIUM, Richard. BALD CYPRESS.

Flowers monœcious, the two kinds on the same branches. Sterile flowers spiked-panicled, of few stamens; filaments scale-like, shield shaped, beari 2 – 5 anther-cells. Fertile catkins ovoid, in small clusters, scaly, with a pair of ovules at the base of each scale. Cone globular, closed, composed of very thick and angular somewhat shield-shaped scales, bearing 2 angled seeds at the base. Cotyledons 6 – 9. — Trees, with narrow linear 2-ranked light and deciduous leaves; a part of the slender leafy branchlets of the season also deciduous in autumn. (Name compounded of τάξος, *the yew*, and εἶδος, *resemblance*, the leaves being Yew-like.)

1. **T. dístichum,** Richard. (AMERICAN BALD CYPRESS.) Leaves linear and spreading; also some awl-shaped and imbricated on flowering branchlets. — Swamps, S. Del. to S. Ill. and Mo., and southward, where it is a very large and valuable tree. March, April.

### 7. CHAMÆCÝPARIS, Spach. WHITE CEDAR. CYPRESS.

Flowers monœcious on different branches, in terminal small catkins. Sterile flowers composed of shield-shaped scale-like filaments bearing 2 – 4 anther-cells under the lower margin. Fertile catkins globular, of shield-shaped scales decussate in pairs, bearing few (1 – 4) erect bottle-shaped ovules at base. Cone globular, firmly closed, but opening at maturity; the scales thick, pointed or bossed in the middle; the few angled or somewhat winged seeds attached to their contracted base or stalk. Cotyledons 2 or 3. — Strong-scented evergreen trees, with very small and scale-like or some awl-shaped closely appressed-imbricated leaves, distichous branchlets, and exceedingly durable wood. (From χαμαί, *on the ground*, and κυπάρισσος, *cypress.*)

1. **C. sphæroídea,** Spach. (WHITE CEDAR.) Leaves minute, pale, ovate or triangular-awl-shaped, often with a small gland on the back, closely imbricated in 4 rows; anther-cells 2 under each scale; cones small (3 – 5″ in diameter) of about 3 pairs of scales: seeds slightly winged. (Cupressus thyoides, *L.*) — Swamps, S. Maine to Fla. and Miss. A tree 30 – 90° high, the wood and fibrous shreddy bark, as well as foliage, much as in Arbor Vitæ.

### 8. THÙYA, Tourn. ARBOR VITÆ.

Flowers mostly monœcious on different branches, in very small terminal ovoid catkins. Stamens with a scale-like filament or connective, bearing 4 anther-cells. Fertile catkins of few imbricated scales, fixed by the base, each bearing 2 erect ovules, dry and spreading at maturity. Cotyledons 2. — Small evergreen trees, with very flat 2-ranked spray, and closely imbricated, small, appressed, persistent leaves; these of two sorts, on different or successive branchlets; one awl-shaped; the other scale-like, blunt, short, and adnate to the branch. (Θυΐα or Θύα, the ancient name of some resin-bearing evergreen.)

1. **T. occidentàlis,** L. (Arbor Vitæ. White Cedar.) Leaves appressed-imbricated in 4 rows on the 2-edged branchlets; scales of the cones pointless; seeds broadly winged all round. — Swamps and cool rocky banks, N. Brunswick to Penn., along the mountains to N. C., west to Minn. A tree 20 – 50° high, with pale shreddy bark, and light, soft, but very durable wood.

## 9. JUNÍPERUS, L. Juniper.

Flowers diœcious, or occasionally monœcious, in very small lateral catkins. Anther-cells 3 – 6, attached to the lower edge of the shield-shaped scale. Fertile catkins ovoid, of 3 – 6 fleshy coalescent scales, each 1-ovuled, in fruit forming a sort of berry, which is scaly-bracted underneath, bluish-black with white bloom. Seeds 1 – 3, ovate, wingless, bony. Cotyledons 2. — Evergreen trees or shrubs, with awl-shaped or scale-like rigid leaves, often of two shapes in § 2. (The classical name.)

§ 1. OXYCÉDRUS. *Aments axillary; leaves in whorls of 3, free and jointed at base, linear-subulate, prickly-pointed, channelled and white glaucous above.*

1. **J. commùnis,** L. (Common Juniper.) Shrub or small tree, with spreading or pendulous branches; leaves rigid, more or less spreading (5 – 9″ long); berry dark blue (3″ or more in diameter). — Dry sterile hills, common. Var. **alpìna,** Gaud., is a decumbent or prostrate form, with shorter (2 – 4″ long) less spreading leaves. — Maine to Minn., and northward.

§ 2. SABÌNA. *Aments terminal; leaves mostly opposite, of two forms,* i. e., *awl-shaped and loose, and scale-shaped, appressed-imbricated and crowded, the latter with a resiniferous gland on the back.*

2. **J. Sabìna,** L., var. **procúmbens,** Pursh. *A procumbent, prostrate or sometimes creeping shrub;* scale-like leaves acute; *berry on short recurved peduncles,* 3 – 5″ in diameter. — Rocky banks, borders of swamps, etc., N. Eng. to N. Minn., and northward.

3. **J. Virginiàna,** L. (Red Cedar or Savin.) *From a shrub to a tree* 60 – 90° *high,* pyramidal in form; scale-like leaves obtuse or acutish, entire; *berries on straight peduncles,* about 3″ in diameter. — Dry hills or deep swamps, common. Bark shreddy, and heart-wood red and aromatic.

## 10. TÁXUS, Tourn. Yew.

Flowers mostly diœcious, or sometimes monœcious, axillary from scaly buds; the sterile small and globular, formed of a few naked stamens; anther-cells 3 – 8 under a shield-like somewhat lobed connective. Fertile flowers solitary, scaly-bracted at base, consisting merely of an erect sessile ovule, with an annular disk, which becomes cup-shaped around its base and at length pulpy and berry-like, globular and red, nearly enclosing the nut-like seed. Cotyledons 2. — Leaves evergreen, flat, mucronate, rigid, scattered, 2-ranked. (The classical name, probably from *τόξον, a bow;* the wood anciently used for bows.)

1. **T. Canadénsis,** Willd. (American Yew. Ground Hemlock.) A low straggling bush, the stems diffusely spreading; leaves linear, green both sides. (T. baccata, var. Canadensis, *Willd.*) — Moist banks and hills, especially under evergreens; Newf. to N. J., Iowa, Minn., and northward.

# CLASS II. MONOCOTYLEDONOUS OR ENDOGENOUS PLANTS.

Stems with no manifest distinction into bark, wood, and pith, but the woody fibre and vessels in bundles or threads which are irregularly imbedded in the cellular tissue; perennial trunks destitute of annual layers. Leaves mostly parallel-veined (nerved) and sheathing at the base, seldom separating by an articulation, almost always alternate or scattered and not toothed. Parts of the flower commonly in threes. Embryo with a single cotyledon, and the leaves of the plumule alternate.

## ORDER 103. HYDROCHARIDÀCEÆ. (FROG'S-BIT FAMILY.)

*Aquatic herbs, with diœcious or polygamous regular flowers, sessile or on scape-like peduncles from a spathe, and simple or double floral envelopes, which in the fertile flowers are united into a tube and coherent with the* 1–3-*celled ovary.* Stamens 3–12, distinct or monadelphous; anthers 2-celled. Stigmas 3 or 6. Fruit ripening under water, indehiscent, many-seeded. Seeds ascending, without albumen; embryo straight.

**Tribe I. HYDRILLEÆ.** Stem elongated, submerged, leafy. Spathes small, sessile.

1. **Elodea.** Leaves verticillate (rarely opposite). Perianth-tube long-filiform.

**Tribe II. VALLISNERIEÆ.** Stemless. Leaves elongated. Spathes pedunculate.

2. **Vallisneria.** Submerged; grass-like. Fertile flower solitary on a very long scape.

**Tribe III. STRATIOTEÆ.** Stem very short, with crowded leaves. Spathes pedunculate. Ovary 6–9-celled.

3. **Limnobium.** Stemless, floating; broad leaves long-petioled.

### 1. ELODÈA, Michx. WATER-WEED.

Flowers polygamo-diœcious, solitary and sessile from a sessile tubular 2-cleft axillary spathe. Sterile flowers small or minute, with 3 sepals barely united at base, and usually 3 similar or narrower petals; filaments short and united at base, or none; anthers 3–9, oval. Fertile flowers pistillate or apparently perfect; perianth extended into an extremely long capillary tube; the limb 6-parted; the small lobes obovate, spreading. Stamens 3–9, often with imperfect anthers or none. Ovary 1-celled, with 3 parietal placentæ, each bearing a few orthotropous ovules; the capillary style coherent with the tube of the perianth; stigmas 3, large, 2-lobed or notched, exserted. Fruit oblong, coriaceous, few-seeded. — Perennial slender submerged herbs, with elongated branching stems, thickly beset with pellucid and veinless, 1-nerved, sessile, whorled or opposite leaves. The staminate flowers (rarely seen) commonly break off, as in Vallisneria, and float on the surface, where they expand and shed their pollen around the stigmas of the fertile flowers, raised to the surface by the prolonged calyx-tube, which varies in length according to the depth of the water. (Name from ἑλώδης, *marshy*.)

1. **E. Canadénsis,** Michx. Leaves in 3's or 4's, or the lower opposite, varying from linear to oval-oblong, minutely serrulate; stamens 9 in the sterile flowers, 3 or 6 almost sessile anthers in the fertile. (Anacharis Canadensis, *Planchon*.) — Slow streams and ponds, common. July.

### 2. VALLISNÈRIA, L. Tape-grass. Eel-grass.

Flowers strictly diœcious; the sterile numerous and crowded in a head on a conical receptacle, enclosed in an ovate at length 3-valved spathe which is borne on a very short scape; stamens mostly 3. Fertile flowers solitary and sessile in a tubular spathe upon an exceedingly lengthened scape. Perianth (calyx) 3-parted in the sterile flowers; in the fertile with a linear tube coherent with the 1-celled ovary, but not extended beyond it, 3-lobed (the lobes obovate); also 3 linear small petals. Stigmas 3, large, nearly sessile, 2-lobed. Ovules very numerous, scattered over the walls, orthotropous. Fruit elongated, cylindrical, berry-like. — Stemless plants, with long linear grass-like leaves, wholly submerged. The staminate clusters being confined to the bottom by the shortness of the scape, the flower-buds themselves break from their short pedicels and float on the surface, where they shed their pollen around the fertile flowers, which are raised to the surface by sudden growth at the same time; afterwards the thread-form scapes (2 – 4 feet long) coil up spirally, drawing the fruit under water to ripen. (Named for *Ant. Vallisneri*, an early Italian botanist.)

1. **V. spiràlis,** L. Leaves linear, thin, long and ribbon-like (1 – 6° long), obscurely serrulate, obtuse, somewhat nerved and netted-veined. — Common in slow waters, N. Eng. to Fla., west to Minn. and Tex.

### 3. LIMNÒBIUM, Richard. American Frog's-bit.

Flowers diœcious, (or monœcious?) from sessile or somewhat peduncled spathes; the sterile spathe 1-leaved, producing about 3 long-pedicelled flowers; the fertile 2 leaved, with a single short-pedicelled flower. Calyx 3-parted or cleft; sepals oblong-oval. Petals 3, oblong-linear. Filaments entirely united in a central solid column, bearing 6 – 12 linear anthers at unequal heights; there are 3 – 6 awl shaped rudiments of stamens in the fertile flowers. Ovary 6 – 9-celled, with as many placentæ in the axis, forming an ovoid many-seeded berry in fruit; stigmas as many as the cells, but 2-parted, awl-shaped. — A stemless perennial herb, floating in stagnant water, proliferous by runners, with long-petioled and round-heart-shaped leaves, which are spongy-reticulated and purplish underneath; rootlets slender, hairy. Sterile flowers rather small; the fertile larger; peduncle nodding in fruit. Petals white? (Name from λιμνόβιος, *living in pools*.)

1. **L. Spóngia,** Richard. Leaves 1 – 2′ long, faintly 5-nerved; peduncle of sterile flower about 3′ long and filiform, of the fertile only 1′ long and stout. — Stagnant water, N. J. to Fla.; also L. Ontario, Ill., and Mo.

## Order 109. BURMANNIÀCEÆ. (Burmannia Family.)

*Small annual herbs, often with minute and scale-like leaves, or those at the root grass-like; the flowers perfect, with a 6-cleft corolla-like perianth, the* *tube of which adheres to the* 1-*celled or* 3-*celled ovary; stamens* 3 *and distinct, opposite the inner divisions of the perianth; capsule many-seeded, the seeds very minute.* — A small, chiefly tropical family.

### 1. BURMÁNNIA, L.

Ovary 3-celled, with the thick placentæ in the axis. Filaments 3, very short. Style slender; stigma capitate-3-lobed. Capsule often 3-winged. (Named for *J. Burmann*, an early Dutch botanist.)

1. **B. biflòra,** L. Stem low and slender (2–4′ high), 2-flowered at the summit, or soon several-flowered; perianth (2–3″ long) bright blue, 3-winged. — Peaty bogs, Va. to Fla.

## ORDER 110. ORCHIDÀCEÆ. (ORCHIS FAMILY.)

*Herbs, clearly distinguished by their perfect irregular flowers, with* 6-*merous perianth adnate to the* 1-*celled ovary, with innumerable ovules on* 3 *parietal placentæ, and with either one or two gynandrous stamens, the pollen cohering in masses.* Fruit a 1-celled 3-valved capsule, with innumerable minute seeds, appearing like fine saw-dust. Perianth of 6 divisions in 2 sets; the 3 outer (*sepals*) mostly of the same petal-like texture and appearance as the 3 inner (*petals*). One of the inner set differs more or less in figure, direction, etc., from the rest, and is called the *lip;* only the other two taking the name of *petals* in the following descriptions. The lip is really the upper petal, i. e. the one next to the axis, but by a twist of the ovary of half a turn it is more commonly directed forward and brought next the bract. Before the lip, in the axis of the flower, is the *column*, composed of a single stamen, or in Cypripedium of two stamens and a rudiment of a third, variously coherent with or borne on the style or thick fleshy stigma; anther 2-celled; each cell containing one or more masses of pollen (*pollinia*) or the pollen granular (in Cypripedium). Stigma a broad glutinous surface, except in Cypripedium. — Perennials, often tuber-bearing or tuberous-rooted; some epiphytes. Leaves parallel-nerved, all alternate. Flowers often showy, commonly singular in shape, solitary, racemed, or spiked, each subtended by a bract, — in all arranged for fertilization by the aid of insects, very few capable of unaided self-fertilization.

**Tribe I. EPIDENDREÆ.** Anther terminal, erect or inclined, operculate. Pollinia smooth and waxy, 4 or 8 (2 or 4 in each cell), distinct, or those in each cell (or all in n. 3 and 7) united at base. (Pollinia 8 only in n. 7 of our genera.)

* Green-foliaged plants, from solid bulbs, with 1 or 2 leaves.

+ Column very short; leaf solitary.

1. **Microstylis.** Flowers racemose, minute, greenish. Petals filiform.

+ + Column elongated: leaves radical.

++ Whole plant (except the flowers) green.

2. **Liparis.** Leaves 2. Raceme few-flowered. Lip flat, entire.
3. **Calypso.** Leaf solitary. Flower large, solitary. Lip saccate.

++ ++ A single green autumnal leaf; otherwise mainly brownish or purplish.

4. **Tipularia.** Raceme many-flowered; flowers small, greenish; lip 3-lobed.
5. **Aplectrum.** Raceme loose; flowers rather large; lip 3-ridged, not spurred or saccate.

* * Leafless, with coralloid roots; whole plant brownish or yellowish; flowers racemose.

6. **Corallorhiza.** Pollinia 4, in 2 pairs. Flower gibbous or somewhat spurred, and lip with 1-3 ridges; sepals and petals 1-3-nerved.

7. **Hexalectris.** Pollinia 8, united. Flower not gibbous; sepals and petals several-nerved; lip with 5-6 ridges.

**Tribe II. NEOTTIEÆ.** Anthers erect upon the back of the column at the summit, or terminal and opercular. Pollinia granular or powdery, more or less cohering in 2 or 4 delicate masses, and attached at the apex to the beak of the stigma.

* Anthers without operculum, erect upon the back of the short column. Flowers small, in spikes or racemes.

8. **Listera.** Stem from a fibrous root, 2-foliate. Lip flat, 2-lobed.

9. **Spiranthes.** Stems leafy below, from tuberous-fascicled roots. Flowers 1-3-ranked in a twisted spike. Lip embracing the column below, with 2 callosities at base.

10. **Goodyera.** Leaves radical, white-reticulated. Lip entire, free from the column, saccate, without callosities.

* * Anther operculate, erect and jointed upon the short column. Stem stout, very leafy.

11. **Epipactis.** Flowers racemose; perianth spreading; lip dilated above.

* * * Anther terminal, operculate, incumbent; column elongated. Stem scapose or few-leaved; flowers large, solitary or few.

12. **Arethusa.** Leaf and flower solitary. Lip bearded, its base adherent to the linear column. Pollinia 4.

13. **Calopogon.** Leaf solitary, grass-like. Lip bearded, stalked, free. Column winged at the apex. Pollinia 4.

14. **Pogonia.** More or less leafy. Lip crested, free. Column clavate. Pollinia 2.

**Tribe III. OPHRYDEÆ.** Anther without operculum, the cells adnate to the top of the column and often continuous with the beak of the stigma. Pollinia 2, of coarse grains united by an elastic web, each attached at base by a stalk to a viscid gland. Flower (in ours) ringent and spurred, spicate upon a leafy stem.

15. **Orchis.** The two glands or viscid disks enclosed in a common pouch.

16. **Habenaria.** The two glands naked, either approximate or widely separated.

**Tribe IV. CYPRIPEDIEÆ.** Perfect anthers 2, lateral, the sterile one forming a dilated fleshy appendage above the terminal stigma. Pollen granular, not in masses.

17. **Cypripedium.** Stems more or less leafy. Perianth spreading; lip an inflated sac.

## 1. MICRÓSTYLIS, Nutt. ADDER'S-MOUTH.

Sepals oblong, spreading. Petals thread-like or linear, spreading. Lip auricled or ovate at base, not tubercled, entire or nearly so. Column very small, terete, with 2 teeth or auricles at the summit and the erect anther between them. Pollen-masses 4, in one row (2 in each cell), cohering by pairs at the apex, waxy, without any stalks, threads, or gland. — Low herbs, from solid bulbs, producing simple stems, which bear in our species a single leaf and a raceme of minute greenish flowers. (Name composed of *μικρός, small,* and *στυλίς, a column* or *style.*)

1. **M. monophýllos,** Lindl. Slender (4-6′ high); leaf sheathing the base of the stem, ovate-elliptical; *racemes spiked, long and slender; pedicels not longer than the flowers;* lip long-pointed. — Cold wet swamps, N. New Eng. to Penn., N. Ind., Minn., and northward. July. (Eu.)

2. **M. ophioglossoìdes,** Nutt. Leaf near the middle of the stem, ovate, clasping; *raceme short and obtuse; pedicels much longer than the flowers;* lip truncate-3-lobed at the summit, the middle lobe very small. — Low moist ground, N. Scotia to Fla., west to Minn. and Mo. July. — Pollinia (at least sometimes) only 1 in each cell.

## 2. LÍPARIS, Richard. TWAYBLADE.

Sepals and petals nearly equal, linear, or the latter thread-like, spreading. Lip flat, entire, often bearing 2 tubercles above the base. Column elongated, incurved, margined at the apex. Anther lid-like, terminal; pollen-masses 4, in one row (2 to each cell), slightly united in pairs, without stalk, threads, or gland. — Small, low herbs, with solid bulbs, producing 2 root-leaves and a low scape, which bears a raceme of few purplish or greenish flowers. (Name from λιπαρός, *fat* or *shining*, in allusion to the smooth or unctuous leaves.)

1 **L. liliifòlia,** Richard. Leaves ovate; petals thread-like, reflexed; *lip large* (1½′ long), *wedge-obovate, abruptly short-pointed, brown-purplish.* — Moist woodlands, N. Eng. to Ga., west to Minn. and Mo. June.

2. **L. Lœsèlii,** Richard. Leaves elliptic-lanceolate or oblong, keeled; *lip obovate or oblong* (2″ long), mucronate, *yellowish-green, shorter than the linear unequal petals and sepals.* — Bogs, N. Scotia to Md., S. Ill., and Minn. (Eu.)

## 3. CALÝPSO, Salisb.

Sepals and petals nearly similar, ascending, spreading, lanceolate, pointed. Lip larger than the rest of the flower, sac-shaped, inflated (9″ long), 2-pointed underneath the apex. Column broadly winged and petal-like, ovate, bearing the lid-like anther just below the apex; pollen-masses waxy, 2, each 2-parted, all sessile on a square gland. — A little bog-herb; the solid bulbs producing a single ovate or slightly heart-shaped thin leaf, as in Aplectrum, and a short (3 – 5′ high) scape, sheathed below, bearing a large and showy (variegated purple, pink, and yellow) flower. (Name from the goddess *Calypso.*)

1. **C. boreàlis,** Salisb. — Cold bogs and wet woods, the bulbs resting in moss, with a coralloid root beneath; Maine and Vt. to Mich. and Minn., and northward. May. — A very local and beautiful plant. Lip somewhat resembling that of a Lady's Slipper, woolly-hairy inside. (Eu.)

## 4. TIPULÀRIA, Nutt. CRANE-FLY ORCHIS.

Sepals and petals spreading, oblong; the latter rather narrower. Lip prolonged beneath into a thread-like ascending spur twice or thrice the length of the flower (9 – 12″ long), 3-lobed; the middle lobe linear, a little wavy, as long as the petals, the side lobes short and triangular. Column narrow and wingless. Anther lid-like, terminal; pollen-masses 2, waxy, each 2-parted, connected by a linear stalk with the transverse small gland. — Herb with large solid bulbs connected horizontally, on a distinct pedicel, producing in autumn a single ovate nerved and plaited leaf on a slender petiole, purplish beneath, and in summer a long slender scape, with 1 or 2 sheaths at base, bearing a raceme of many small greenish flowers tinged with purple. (Name from a fancied resemblance of the flowers to insects of the genus *Tipula.*)

1. **T. díscolor,** Nutt. Scape 10 – 18′ high; lip blunt at the tip. — Sandy woods, Vt. to N. J. and Fla., west to Mich.; very scarce.

## 5. APLÉCTRUM, Nutt. PUTTY-ROOT. ADAM-AND-EVE.

Perianth neither gibbous nor with any trace of a spur or sac at the base. Lip free, the palate 3-ridged. Otherwise the flowers and scape (invested below with 3 greenish sheaths) as in Corallorhiza; but, instead of a coral-like root, a slender naked rootstock produces each year a thick, globular, solid bulb or corm, often 1′ in diameter (filled with exceedingly glutinous matter), which sends up late in summer a large, oval, many-nerved and plaited, petioled, green leaf, lasting through the winter, and early in the succeeding summer its scape is terminated by a loose raceme of dingy rather large flowers. (The name composed of *α*- privative and *πλῆκτρον, a spur,* from the total want of the latter.)

1. **A. hiemàle,** Nutt. Stem 1° high or more; perianth greenish-brown, or the lip whitish, and somewhat speckled with purple, 5 – 6″ long. — Woods, in rich mould; rather rare or local, N. Eng. to Ga., west to Minn. and Mo. — Each corm lasts 2 or 3 years before it shrivels, so that 3 or 4 are found horizontally connected.

## 6. CORALLORHÌZA, Haller. CORAL-ROOT.

Perianth somewhat ringent, oblique and gibbous or obscurely spurred at base; the oblong or lanceolate sepals and petals nearly alike, 1 – 3-nerved, the upper arching; the lateral sepals ascending, their bases with that of the lip forming the gibbosity or short spur which is mostly adnate to the summit of the ovary; lip slightly adherent to the base of the 2-edged straightish column, bearing a pair of projecting ridges on the face below, spreading or recurved at the apex. Anther terminal, lid-like. Pollen-masses 4, obliquely incumbent, soft-waxy, free. — Brownish or yellowish herbs, destitute of green foliage, with much-branched and toothed coral-like root stocks (probably root-parasitical), sending up a simple scape, with sheaths in place of leaves and bearing a raceme of rather small dull-colored flowers; fruit reflexed. (Name composed of *κοράλλιον, coral,* and *ῥίζα, root.*)

§ 1. *Small spur or sac adnate to the summit of the ovary; flowers small; lip whitish or purplish, often mottled with crimson.*

1. **C. innàta,** R. Brown. Plant slender, light brownish or yellowish (3 – 9′ high), 5 – 12-flowered; pedicels very short; perianth 2 – 2½″ long; *lip somewhat hastately 3-lobed above the base,* the lamellæ thick and rather short; spur a very small protuberance; capsule oval or elliptical (3 – 4″ long). — Swamps and damp woods, N. Eng. to northern N. J., Ohio, Mich., Minn., and northward, and south in the mountains to Ga. May, June. (Eu.)

2. **C. odontorhìza,** Nutt. Plant light brown or purplish; stem rather slender, bulbous-thickened at base (6 – 16′ high), 6 – 20-flowered; pedicels rather slender; perianth about 3″ long; *lip entire* or merely denticulate, *thin,* broadly ovate or obovate, abruptly contracted into a *claw-like base,* the lamellæ a pair of short projections; the spur represented by a small cavity wholly adnate to the summit of the ovary; capsule at first very acute at base, at length short-oval (4″ long). — Rich woods, E. Mass. (*Hitchings*) and Vt. to N. J. and Fla., west to Mich. and Mo. May – July.

3. **C. multiflòra,** Nutt. Plant purplish, rather stout (9 – 18′ high), 10 – 30-flowered; perianth 2½ – 4″ long; *lip deeply 3-lobed,* with a short narrowed base and with prominent lamellæ; spur manifest and protuberant; capsule oblong (6 – 9″ long), short-pedicelled. — Dry woods, N. Eng. to Md., west to Mo., Iowa, and Minn. July – Sept.

§ 2. *Spur none; the broadly gibbous somewhat saccate base wholly free from the ovary; flowers large for the genus, purple, unspotted, more expanding.*

4. **C. striàta,** Lindl. Plant purplish, stout (6–16′ high), bearing 15–25 large flowers in a crowded spike, on very short pedicels; perianth 6–7″ long; lip oval or obovate, perfectly entire, concave, barely narrowed at the base, where it bears 1–3 short lamellæ; all the parts of the perianth marked with 3 darker nerves; pod oblong (9″ long). (C. Macræi, *Gray.*) — Woods, from L. Erie westward along the Great Lakes and to the Pacific.

## 7. HEXALÉCTRIS, Raf.

Sepals and petals nearly equal, somewhat spreading, several-nerved, not gibbous nor spurred at base, free. Lip obovate, with 5–6 prominent ridges down the middle, 3-lobed above, the middle lobe somewhat concave. Pollen-masses 8, united into a single fascicle. Otherwise as in Corallorhiza. (Name probably from ἕξ, *six*, and ἀλεκτρυών, *a cock*, from the crests of the lip.)

1. **H. aphýllus,** Raf. Stem 1–2° high, beset with purplish scales, the lower sheathing; flowers racemed, bracteate, brownish-purple, 6–8″ long. (Bletia aphylla, *Nutt.*) — Rich woods, Ky. and Mo. to Fla. and Mex.

## 8. LÍSTERA, R. Brown. TWAYBLADE.

Sepals and petals nearly alike, spreading or reflexed. Lip mostly drooping, longer than the sepals, 2-lobed or 2-cleft. Column wingless; stigma with a rounded beak. Anther borne on the back of the column at the summit, erect, ovate; pollen powdery, in 2 masses, joined to a minute gland. — Roots fibrous. Stem bearing a pair of opposite sessile leaves in the middle, and a spike or raceme of greenish or brownish-purple small flowers. (Dedicated to *Martin Lister*, an early and celebrated British naturalist.)

* *Column very short; sepals ovate, reflexed; plants delicate,* 4–8′ *high.*

1. **L. cordàta,** R. Brown. Leaves round-ovate, somewhat heart-shaped (½–1′ long); raceme smooth; *flowers minute, crowded, on pedicels not longer than the ovary; lip* linear, twice as long as the sepals, 1-toothed each side at base, 2-*cleft.* — Cold woods, N. J. to Mich., Minn., and northward. June. (Eu.)

2. **L. austràlis,** Lindl. Leaves ovate; *raceme loose and slender; flowers very small, on minutely glandular-pubescent pedicels twice the length of the ovary; lip* linear, 3–4 times the length of the sepals, 2-*parted, the divisions linear-setaceous.* — Damp thickets, Oswego Co., N. Y., and from N. J. to Fla. June.

* * *Column longer, arching or straightish.*

3. **L. convallarioìdes,** Nutt. Plant 4–9′ high; leaves oval or roundish, and sometimes a little heart-shaped (1–1½′ long); raceme loose, pubescent; pedicels slender, lip wedge-oblong, 2-lobed at the dilated apex, and 1-toothed on each side at the base, nearly twice the length of the narrowly lanceolate spreading sepals, purplish, ⅓′ long. — Damp mossy woods, N. New Eng. to Mich., Minn., and northward, and south in the mountains to N. C.

## 9. SPIRÁNTHES, Richard. LADIES' TRESSES.

Perianth somewhat ringent, oblique on the ovary; the sepals and petals all narrow, mostly erect or connivent, the three upper pieces sticking together more or less, the two lower covering the base of the lip. Lip oblong, short-stalked or sessile, the lower part involute around the column, and with a callous protuberance on each side of the base; the somewhat dilated summit spreading or recurved, crisped, wavy, or rarely toothed or lobed. Column short, oblique, bearing the ovate stigma on the front, and the sessile or short-stalked (mostly acute or pointed) 2-celled erect anther on the back. Pollen-masses 2 (one in each cell), narrowly obovate, each 2-cleft, and split into thin and tender plates of granular pollen united by elastic threads, and soon adhering at base to the narrow boat-shaped viscid gland, which is set in the slender or tapering thin beak terminating the column. After the removal of the gland, the beak is left as a 2-toothed or 2-forked tip. — Roots clustered-tuberous; stem more or less naked above, leaf-bearing below or at the base. Flowers small (ours all white or greenish-white), bent horizontally, 1 – 3-ranked in a spike, which is commonly more or less spirally twisted (whence the name, from *σπεῖρα, a coil* or *curl*, and *ἄνθος, flower*).

* *Flowers in 3 ranks, crowded in a close spike: leaves at the root and base of the stem present at the flowering season.*

1. **S. latifòlia,** Torr. Low; naked stem or scape 4 – 9′ (rarely 12′) high, smooth; *leaves all next the base, oblong or lance-oblong* (1 – 4′ long, 3 – 9″ wide), 3 – 5-nerved, contracted into a sheathing base; spike narrow (1 – 3′ long); *flowers small* (2 – 3″ long); lip quadrate-oblong, yellowish on the face, not contracted in the middle, thin, wavy-crisped at the very obtuse or truncate apex, the small *callosities* at the base *oblong, marginal and adnate* for their whole length; gland and beak of the stigma short. — Moist banks, Vt. and W. Mass. to Mich. and Minn., south to Del. and Md.

2. **S. Romanzoffiàna,** Cham. Stem *leafy below and leafy-bracted above* (5 – 15′ high); leaves varying from oblong-lanceolate to grassy-linear; spike dense, oblong or cylindrical (1 – 4′ long); perianth curved and the summit *manifestly ringent,* pure white (4″ long), the sepals and petals all connivent in the upper portion or galea; the *lip ovate-oblong, contracted below the rounded wavy-crenulate much recurved summit,* otherwise entire, the callosities at base globular and smooth; gland oblong-linear and the 2-horned *beak of the stigma short.* — High and cool bogs, N. New Eng. to Mich. and Minn., and northward; Norfolk, Conn. (*Barbour*); central N. Y. July, Aug. (Ireland.)

3. **S. cérnua,** Richard. Stem *leafy below and leafy-bracted* above (6 – 20′ high); *leaves linear-lanceolate,* the lowest elongated (4 – 12′ long, 2 – 9″ wide); spike cylindrical, rather dense (2 – 5′ long) and with the white fragrant flowers either pubescent or nearly smooth; perianth horizontal or recurving (4 – 5″ long), the *lower sepals not upturned* or connivent with the upper; *lip oblong* and very obtuse when outspread, but conduplicate or the margins much incurved, wavy-crisped above the middle, especially at the flattish and recurved-spreading apex, the callosities at the base prominent, nipple-shaped, somewhat hairy; gland of the stigma linear, in a *long and very slender beak.* — Common in wet places, especially eastward and southward. Sept., Oct. Very variable in size and foliage, often nearly losing its root-leaves at flowering time. — A variety, growing in dry ground but retaining its leaves and blooming somewhat later, has greenish cream-colored or yellowish stronger-scented flowers. E. Mass and Del.

* * *Flowers in one straight or spirally twisted rank.*

+– *Stem bearing elongated leaves at and toward the base, which mostly persist during the flowering season.*

4. **S. prǽcox,** Watson. Root of fleshy or tuberous-thickened fibres; stem 9′–2° high; lower and root-leaves linear or lance-linear (3–8′ long, 2–4″ wide) gradually tapering to the base, the upper reduced to sheathing bracts; spike linear, dense (2–5′ long), usually much twisted, the axis, ovaries, etc., downy-pubescent; bracts ovate and gradually, or rhombic-ovate and abruptly taper-pointed, surpassing the ovary, the margins broadly hyaline; perianth 3″ long; lip ovate-oblong when outspread, with rather small callosities at base, crisped at the rounded slightly recurved apex; anther and beak of the stigma very acute. (S. graminea, var. Walteri, *Gray.*) — Wet, grassy places, Mass. to N. J. and Fla.

+– +– *Scape very slender, merely bracted; the leaves with a blade all in a cluster at the ground, ovate or oblong, abruptly contracted into a petiole, commonly withering away at or before flowering; flowers small, and whole plant glabrous or nearly so; bracts small, sharp-pointed, not longer than the capsule.*

5. **S. grácilis,** Bigelow. *Roots clustered, tuberous-thickened:* scape 8–18′ high, bearing a slender many-flowered one-sided or twisted spike; perianth barely 1½–2″ long; *lip oval* when outspread, narrowly oblong in natural form, *thickish and green above* with thin white margins, the recurved obtuse or acutish apex wavy-crisped, the callosities at the base nipple-shaped. — Hilly woods and sandy plains, common. July–Oct.

6. **S. símplex,** Gray. Root a *solitary oblong or spindle-shaped tuber;* no leaves at flowering time; scape 5–9′ high, bearing a small narrow (rarely 1-sided) spike (1–3′ long) of *very short flowers* (perianth 1–1½″ long); *lip thin, white, obovate-oblong,* the apex eroded and crisped, the callosities at the base slender. — Dry sandy soil, E. Mass. to N. J., Del., and Md. Aug., Sept.

## 10. GOODYÈRA, R. Br. RATTLESNAKE-PLANTAIN.

Lip sac-shaped, sessile, entire, and without callosities at base. Otherwise as Spiranthes. — Root of thick fibres, from a somewhat fleshy creeping rootstock, bearing a tuft of thickish petioled leaves, usually reticulated with white veining. Scape, spike, and the greenish-white small flowers usually glandular-downy. (Dedicated to *John Goodyear,* an early English botanist.)

§ 1. *Lip strongly saccate-inflated and with a short spreading or recurved tip; anther short, borne on a distinct filament attached to the back of the short column, blunt; gland-bearing tip or beak of the stigma very short.*

1. **G. rèpens,** R. Br. Small (5–8′ high) and slender; leaves ovate, more or less white-reticulated (about 1′ long); *flowers several, in a loose 1-sided spike;* lip with an ovate recurved tip; sepals ovate. — Woods, under evergreens, common northward and through the Alleghanies. July. (Eu.)

2. **G. pubéscens,** R. Br. Larger; leaves strongly white-reticulated; scape 6–12′ high, the *numerous crowded flowers not one-sided;* tip of the *globular lip very short:* otherwise like the preceding, and too near to it. — Rich woods, Newf. to Fla., west to Mich. and Minn.

§ 2. *Lip barely saccate below, tapering and its sides involute above; anther ovate, long-pointed, borne on the base of the very short column, which is continued above the stigma into a conspicuous tapering awl-shaped gland-bearing beak.*

3. **G. Menzièsii,** Lindl. Leaves ovate-oblong, acute (2 – 3′ long), less white-reticulated than the preceding, some not at all so; scape 9 – 12′ high; flowers rather numerous in a looser often 1-sided spike; flower-buds less pubescent, elongated-ovate and pointed; lip with the saccate-conduplicate lower portion gradually tapering into the narrow barely spreading summit. — Woods, Gaspe and Tadousac, L. Can. (*J. A. Allen, Goodale*); Crawford, N. H. (*Miss Minns*); western N. Y. to Minn., and westward. July.

## 11. EPIPÁCTIS, Haller.

Sepals and petals nearly equal, spreading. Lip free, deeply concave at base, narrowly constricted and somewhat jointed in the middle, the upper portion dilated and petaloid. Column short, erect. Anther sessile behind the broad truncate stigma, on a slender-jointed base; pollen-masses coarsely granular, becoming attached to the gland capping the small rounded beak of the stigma. — Stem leafy, with racemed flowers, conspicuous bracts, and ovaries reflexed at maturity. (The ancient Greek name of a plant.)

1. **E. Helleborìne,** Crantz. Stems 1 – 2° high; leaves broadly ovate (2 – 3′ long), pointed, plicate, the upper narrower; raceme pubescent, 30 – 50-flowered, 1-sided; flowers varying from light greenish-yellow to dark purple; sepals ovate-lanceolate, 3 – 4″ long; petals rather smaller; lip ovate, pointed above, with a dark centre. (E. latifolia, *All.*) — Near Syracuse and Buffalo, N. Y.; the only known stations. (Eu.)

## 12. ARETHÙSA, Gronov.

Flower ringent; the lanceolate sepals and petals nearly alike, united at base, ascending and arching over the column. Lip dilated and recurved-spreading toward the summit; very slightly gibbous at base. Column adherent to the lip below, petal-like, dilated at the apex. Anther lid-like, terminal, of 2 approximate cells; pollen-masses powdery-granular, 2 in each cell. — Beautiful low herbs, consisting of a sheathed scape from a globular solid bulb, terminated usually by a single large rose-purple flower. Leaf solitary, linear, nerved, hidden in the sheaths of the scape, protruding after flowering. (Dedicated to the nymph *Arethusa*.)

1. **A. bulbòsa,** L. Flower single (rarely 2), erect (1 – 2′ long), with an entire lip recurved at the apex and bearded-crested down the face. — Bogs, Newf. to the mountains of N. C., west to Ind. and Minn.

## 13. CALOPÒGON, R. Br.

Flower with the ovary or stalk not twisting, therefore presenting its lip on the upper or inner side. Sepals and petals nearly alike, lance-ovate, spreading, distinct. Lip spreading, distant from the column, raised on a narrowed base or stalk, dilated at the summit, strongly bearded along the upper side. Column free, slender, winged at the apex. Anther terminal and lid-like, sessile; pollen-masses 4 (two in each cell), of soft powdery grains, lightly connected by delicate threads. — Scape from a small solid bulb, sheathed below by the base of the grass-like leaf, naked above, bearing several large flowers. Bracts minute. (Name composed of καλός, *beautiful*, and πώγων, *beard*, from the bearded lip.)

1. **C. pulchéllus,** R. Br. Leaf linear; scape about 1° high, 2 – 6-flowered; flowers 1′ broad, pink-purple; lip as if hinged at the insertion, beautifully bearded toward the dilated summit with white, yellow, and purple club-shaped hairs. — Bogs, Newf. to Fla., west to Minn. and Mo.

### 14. POGÒNIA, Juss.

Flower irregular, the sepals and petals separate. Lip crested or 3-lobed. Column free, elongated, club-shaped, wingless. Anther terminal and lid-like, stalked; pollen-masses 2 (one in each cell), powdery-granular. (Πωγωνίας *bearded*, from the lip of some of the original species.)

§ 1. *Sepals and petals nearly equal and alike, pale rose-color, sometimes white.*

1. **P. ophioglossoìdes,** Nutt. Root of thick fibres; stem (6 – 9′ high) bearing a single oval or lance-oblong leaf near the middle and a smaller one or bract near the terminal flower, rarely one or two others with a flower in the axil; flower 1′ long, sweet-scented; lip spatulate, appressed below to the column, beard-crested and fringed. — Bogs, Newf. to Fla., west to N. Ind. and Minn. June, July. (Japan.)

2. **P. péndula,** Lindl. Stem (3 – 8′ high) from oblong tubers, bearing 3 to 7 alternate ovate-clasping very small (3 – 6″) leaves, the upper 1 – 4 with drooping flowers in their axils on slender pedicels; perianth ½′ long, narrow; lip spatulate, somewhat 3-lobed, roughish or crisped above, crestless. — Damp woods, N. Eng. to Fla., west to Wisc. and Mo.

§ 2. *Sepals linear, dingy or brownish, longer and much narrower than the erect or connivent petals; lip 3-lobed at the apex, crested down the middle, beardless; flowers solitary (or rarely a pair), terminal; root a cluster of fibres.*

3. **P. divaricàta,** R. Br. Stem (1 – 2° high) bearing *a lanceolate leaf in the middle, and a leafy bract* next the flower, which is recurved on the ovary; but the sepals ascending or diverging, spatulate-linear, longer than the lanceolate-spatulate pointed and flesh-colored petals, these about 1 – 1½′ long. — Wet pine-barrens, N. J. to Fla. June, July.

4. **P. verticillàta,** Nutt. Stem (6 – 12′ high) naked, except some small scales at the base and a *whorl of mostly 5 obovate or obovate-oblong sessile leaves* at the summit; flower dusky purplish, on a *peduncle longer than the ovary and capsule; sepals more than twice the length of the petals,* narrowly linear, spreading from a mostly erect base (1½ – 2′ long); lip with a narrow crest down the middle. — Low woods, N. Eng. to Fla., west to Ind. and Wisc.; rather rare, especially eastward. May, June. Glaucous when young. Fruit-stalk erect, about 1½′ long, more than half the length of the leaves.

5. **P. affinis,** Austin. Somewhat smaller than the preceding; leaves paler and rather narrower; flowers (not rarely in pairs) yellowish or greenish; *peduncle much shorter than the ovary and capsule; sepals but little longer than the petals,* tapering to the base; lip crested over the whole face and on the middle of the lobes. — Low woods, S. W. Conn., S. New York, and N. New Jersey; rare.

## 15. ÓRCHIS, L.

Flower ringent; the sepals and petals nearly equal. Lip turned downward, coalescing with the base of the column, spurred below. Anther-cells contiguous and parallel. Pollen cohering in numerous coarse waxy grains, which are collected on a cobweb-like elastic tissue into 2 large masses (one filling each anther-cell) borne on a slender stalk, the base of which is attached to a gland or sticky disk of the stigma, the two glands contained in a common little pouch or hooded fold, placed just above the orifice of the spur. Flowers showy, in a spike. — Our species with low scape-like stems, with 1 or 2 leaves at base, from fleshy-fibrous roots. (Ὄρχις, the ancient name.)

1. **O. spectábilis,** L. (Showy Orchis.) Root of thick fleshy fibres, *producing 2 oblong-obovate shining leaves* (3 – 6′ long), and a few-flowered 4 angled scape (4 – 7′ high); bracts leaf-like, lanceolate; sepals and petals all lightly united to form the vaulted galea or upper lip, pink-purple, the ovate undivided lip white. — Rich woods, N. Brunswick to Ga., west to Minn. and Mo. May.

2. **O. rotundifòlia,** Pursh. Stem naked above, 1-*leaved at base* (5 – 9′ high), from a slender creeping rootstock; leaf varying from almost orbicular to oblong (1½ – 3′ long); flowers rose-purple, the lip white and spotted with purple, 3-lobed, and the larger middle lobe dilated and 2-lobed or strongly notched at the summit (4 – 6″ long), exceeding the ovate-oblong petals and sepals, and the slender depending spur. (Habenaria rotundifolia, *Richardson.*) — Damp woods and bogs, N. Maine to Vt., N. Y., Minn., and northward.

## 16. HABENÀRIA, Willd. Rein-Orchis.

Glands or viscid disks (to which the pollen-masses are attached) naked and exposed, separate, sometimes widely so (becoming attached, some to the proboscis, others to the face or head of insects feeding upon the nectar of the spur, the pollen thus carried from one blossom to another); otherwise nearly as in true Orchis; the lateral sepals, however, mostly spreading. (Name from *habena*, a thong or rein, in allusion to the shape of the lip or spur of some species.)

§ 1. GYMNADÈNIA. *Cells of the anther parallel and approximate, their glands therefore contiguous.* (*Appendages of the stigma in our species two or three and much developed, oblong or club-shaped.*)

1. **H. tridentàta,** Hook. Stem slender (6 – 12′ high), with a single oblong or oblanceolate obtuse leaf below, and 2 or 3 small ones like bracts above; spike 6 – 12-flowered, oblong; *flowers greenish or whitish, very small; lip wedge-oblong, truncate, and with 3 short teeth at the apex;* the slender and slightly club-shaped spur curved upward, longer than the ovary. — Wet woods, N. Eng. to Minn. and Ind., and south in the mountains to N. C. June, July. — Root of few fleshy fibres. Appendages of the stigma three, oblong-club-shaped, one outside each orbicular gland and one between them, rising as high as the anther-cell, their cellular viscid summits receiving pollen in the unopened flower, and penetrated by pollen-tubes!

2. **H. íntegra,** Spreng. Root of very fleshy fibres (or some of them tuber-like); stem several-leaved (15′ high), the 1 or 2 lower leaves elongated, oblong-lanceolate, acute, the others becoming smaller and bract-like; spike densely many-flowered, oblong-cylindrical; *flowers orange-yellow*, small; *lip*

*ovate, entire* or slightly crenulate or wavy, shorter than the awl-shaped descending spur. — Wet pine-barrens, N. J. to Fla. July. — Appendages of the stigma two, lateral, oblong, fleshy; beak or middle appendage narrow.

3. **H. nívea,** Spreng. Stem slender, 1 – 1½° high, many-leaved, the 1 or 2 lower leaves lance-linear and 4 – 8′ long, the others small and bract-like; spike cylindrical, loosely many-flowered; *flowers white, small;* petals and *entire lip linear-oblong:* spur thread-shaped, ascending, as long as the white ovary, which is not twisted. — Pine-barren swamps, S. Del. to Fla. Aug.

§ 2. PERULÀRIA. *Cells of the anther nearly parallel, the valves of each extended at base so as to form the sides of a deep oblong groove or cavity, which is lined by the dilated orbicular and incurved gland. (Flowers small, greenish, slender-spurred.)*

4. **H. viréscens,** Spreng. Leaves ovate-oblong or oblong-lanceolate, the uppermost linear-lanceolate and pointed, passing into the bracts of the elongated raceme; petals ovate; flowers dull green; lip furnished with a tooth on each side and a strong nasal protuberance in the middle of the base, oblong, truncate-obtuse, about the length of the sepals, half the length of the slender club-shaped spur. — Wet places, common; N. Eng. to Fla., west to Minn. and Mo. June, July. — Stem 10 – 20′ high; the spike at first dense, with the bracts longer than the flowers, at length elongated and often loose, the upper bracts shorter than the flowers, which are quite small, and with scarcely a tinge of yellow, drying brownish.

§ 3. PLATANTHÈRA. *Cells of the anther sometimes parallel, more commonly divergent, so that their tapering bases and the exposed glands are more or less distant. (Root a cluster of fleshy fibres, or tuberous-thickened.)*

* *Flowers greenish or white, small, numerous in a close spike; spur not longer than the entire or merely notched narrow lip; anther-cells almost parallel, wholly adnate; stem leafy.*

+ *Spur short and sac-like; the 3 sepals and 2 narrow petals erect; glands small, rather widely separated.*

5. **H. bracteàta,** R. Br. Stem 6 – 12′ high; lower leaves obovate, the upper oblong and gradually reduced to lanceolate acute bracts 2 – 4 times the length of the green flowers; spike 10 – 30-flowered; lip oblong-linear or slightly spatulate, truncate and 2 – 3-toothed or lobed at the tip, more than twice the length of the white spur. (H. viridis, var. bracteata, *Reichenb.*) — Damp woods and meadows, N. Eng. to Minn., Iowa, Ind., south in the mountains to N. C., and far northward.

+ + *Spur slender, incurved, about equalling the entire lip; lateral sepals spreading.*

6. **H. hyperbòrea,** R. Br. Stem very leafy (6′ – 2° high); *leaves lanceolate,* erect; spike dense (2 – 15′ long); lower bracts lanceolate, longer than the *(greenish) flowers; lip and petals lanceolate, somewhat equal,* the latter spreading from the base; anther somewhat overhanging the transversely dilated stigma; *glands orbicular;* stalk of the pollen-masses very slender and weak. — Peat bogs and wet cold woods, N. Eng. to N. Y., S. Ill., Iowa, and northward. June, July. (Eu.)

7. **H. dilatàta,** Gray. Resembles n. 6, but usually more slender, with narrower commonly *linear leaves; flowers white; lip lanceolate from a rhom-*

*boidal-dilated base*, entire, its base with the bases of the petals and sepals erect-connivent, above spreading; anther-cells almost parallel; *glands approximate, large and strap-shaped, vertical*, nearly as long as the pollen-mass and its short flat stalk together; stigma narrow; a trowel-shaped conspicuous beak between the bases of the anther-cells. — Cold bogs, Conn. to N. Y., Mich., Minn., and northward.

* * *Flowers greenish or white*, 5 – 15 *in a loose spike, rather large for the size of the plant; scape or stem naked above*, 1-*leaved at base* (5 – 9′ *high*); *spur not longer than the lip; anther-cells wholly adnate, arcuate and widely separated.*

8. **H. obtusàta,** Richardson. Leaf obovate or spatulate-oblong; upper sepal very broad and rounded, the others and the petals lance-oblong; lip entire, linear or lanceolate, deflexed (3″ long), about the length of the tapering and curving spur. — Cold peat bogs, Maine and N. New Eng. (Mt. Wachusett, Mass.), to Minn. and northward. (Eu.)

* * * *Flowers white or greenish, numerous in a loose spike, on a naked scape*, 2-*leaved at base; spur longer than the narrow entire lip; anther-cells widely diverging, their narrowed beak-like bases projecting forward; stalk of the pollen-mass laterally affixed to the back of the orbicular gland, the viscous face of which looks obliquely inward.*

9. **H. Hoókeri,** Torr. Leaves orbicular, spreading (3 – 4′ broad); scape mostly naked (½ – 1° high), bearing 10 – 20 upright sessile *yellowish-green flowers in a strict spike*; sepals ovate-lanceolate; lip lanceolate, pointed, incurved, longer than the *lance-awl-shaped petals; spur slender, acute, about the length of the ovary* (nearly 1′ long). — Damp woods and borders of swamps, N. Scotia to N. J., west to Minn. and Iowa. — Var. OBLONGIFÒLIA, Paine, has oblong leaves (3 – 5′ by 1½ – 2′). N. Y. and Can.

10. **H. orbiculàta,** Torr. Leaves very large (4 – 8′ wide), orbicular, spreading flat on the ground, shining above, silvery beneath; scape bracted (1 – 2° high), bearing many spreading *greenish-white flowers in a loose raceme*; upper sepal orbicular, the lateral ovate; *lip narrowly linear and slightly spatulate, obtuse*, drooping, nearly thrice the length of the oblong-lanceolate and falcate obtuse petals; *spur curved*, slender (about 1½′ long), gradually *thickened* toward the blunt apex, *twice the length of the ovary*; anther-cells strongly projecting at the free beak-like base (the glands nearly ¼′ apart). — Rich woods (especially coniferous), Newf. to Penn. and in the mountains to N. C., west to Mich. and Minn.

* * * * (Fringed Orchis.) *Flowers several or many in an open spike, with mostly foliaceous bracts; stem* (*rather tall*) *leafy; spur thread-shaped or scarcely club-shaped, longer than the fringed, cleft, or dissected lip; anther-cells widely separated and usually diverging, their narrow beak-like bases, supported by the arms of the stigma, strongly projecting forward or partly upward.*

+- *Lip pectinately fringed but undivided; flowers golden yellow or white; anther-cells widely divergent, the orbicular glands as if raised on a tentacle projecting far forward or slightly inward; ovary long, tapering to the summit.*

11. **H. cristàta,** R. Br. Lower leaves lanceolate, elongated; the upper gradually reduced to sharp-pointed *bracts, nearly the length of the crowded*

(*yellow*) *flowers;* spike oblong or cylindrical; petals rounded, crenate; *lip ovate, with a lacerate-fringed margin, scarcely shorter than the* slender obtuse incurved *spur,* which is not half the length of the ovary. — Bogs, N. J. to Fla. July. Flowers very much smaller than in the next.

12. **H. ciliàris,** R. Br. (YELLOW FRINGED-ORCHIS.) Stem 1½ – 2° high; leaves oblong or lanceolate; the upper passing into pointed *bracts,* which are *shorter than the ovaries;* spike oblong, rather closely many-flowered; *flowers bright orange-yellow;* lateral sepal rounded, reflexed; petals linear, cut-fringed at the apex; *lip oblong* (6″ long), *about half the length of the spur furnished with a very long and copious capillary fringe.* — Wet sandy places, N. Eng. to Fla. and Tex., west to Mich. and Ind. Our most handsome species.

13. **H. blephariglóttis,** Torr. (WHITE FRINGED-ORCHIS.) Stem 1° high; leaves, etc., as in the last; *flowers white,* rather smaller; petals spatulate, usually slightly cut or toothed at the apex; lip ovate- or lanceolate-oblong, with the irregular capillary fringe of the margins usually shorter than its disk, one third the length of the spur. — Peat bogs and borders of ponds, Newf. to N. J., west to Mich. and Minn. July. — Var. HOLOPÉTALA, Torr., has narrower petals with the toothing obsolete, and the lip less fringed.

+ + (GREENISH FRINGED-ORCHIS.) *Lip 3-parted above the stalk-like base, the divisions cut into capillary fringes: flowers greenish- or yellowish-white; anther-cells not very divergent, the beaked bases projecting forward; the large glands oval or lanceolate, nearly facing each other; ovary short-tapering above; spurs long, clavate.*

14. **H. leucophæa,** Gray. Stem 2 – 4° high; leaves oblong-lanceolate; the bracts similar, rather shorter than the (large, fragrant) flowers; spike commonly elongated, loose; *petals obovate, minutely cut-toothed; divisions of the lip* (7 – 10″ long) *broadly wedge-shaped or fan-shaped, many-cleft to the middle into a copious thread-like fringe;* spur longer than the ovary (1 – 1½′ long); glands transversely oval. — Moist meadows, western N. Y. to Ky., Mo., and Minn. July.

15. **H. lácera,** R. Br. (RAGGED FRINGED-ORCHIS.) Leaves oblong or lanceolate; raceme loosely many-flowered; *petals oblong-linear, entire; divisions of the lip narrow, deeply parted into a few long nearly capillary lobes;* spur about the length of the ovary; *glands oblong-linear,* as long as the stalk of the pollen-mass. — Bogs and moist thickets, N. Scotia to N. C. and Ga., west to Minn. and Mo.; common. July.

+ + + (PURPLE FRINGED-ORCHIS.) *Lip fan-shaped, 3-parted above the stalk-like base, the divisions erosely fringed; flowers purple; anther-cells widely separated, little divergent, the orbicular glands oblique: ovary contracted only at the summit; the long curving spur somewhat clavate.*

16. **H. psycòdes,** Gray. Leaves oblong or lanceolate, the uppermost passing into linear-lanceolate bracts; *raceme cylindrical, densely many-flowered; lower sepals round-oval, obtuse; petals wedge-obovate or spatulate, denticulate above;* divisions of the spreading lip broadly wedge-shaped, many-cleft into a *short fringe.* — Wet meadows and bogs, common; Newf. to N. C., west to Ind. and Minn. July, Aug. — Flowers short-pedicelled, crowded in a spike of 4 – 10′ in length, small, but very handsome, fragrant; lip short-stalked,

barely ½′ broad and not so long; the middle lobe broadest and more closely fringed, but not so deeply cleft as the lateral ones.

17. **H. fimbriàta,** R. Br. Lower leaves oval or oblong, the upper few, passing into lanceolate bracts; *spike or raceme oblong, loosely-flowered; lower sepals ovate, acute; petals oblong, toothed down the sides;* divisions of the pendent large lip (¾ – 1′ broad) fan-shaped, more fringed. — Wet meadows, N. Scotia to N. J. and N. C., west to Mich. June. — Flowers fewer (lilac-purple), 3 or 4 times larger than those of the preceding.

18. **H. peramœna,** Gray. Lower leaves oblong-ovate, the upper lanceolate; spike oblong or cylindrical, densely flowered; lower sepals round-ovate; petals rounded-obovate, raised on a claw; *divisions of the large lip very broadly wedge-shaped, irregularly eroded-toothed* at the broadly dilated summit, *the lateral ones truncate, the middle one 2-lobed.* — Moist meadows and banks, Penn. and N. J. to Ill., and south in the mountains. Aug. — Flowers large and showy (violet-purple); the lip paler and 8 – 10″ long, variably toothed, but not fringed.

### 17. CYPRIPÈDIUM, L. LADY'S SLIPPER. MOCCASON-FLOWER.

Sepals spreading; all three distinct, or in most cases two of them united into one under the lip. Petals spreading, resembling the sepals but usually narrower. Lip a large inflated sac. Column declined; on each side a fertile stamen, with its short filament bearing a 2-celled anther; the pollen loose and pulpy or powdery-granular; on the upper side a dilated-triangular, petal-like but thickish body, which answers to the fertile stamen of other Orchids, and covers the summit of the style; stigma terminal, broad, obscurely 3-lobed, moist and roughish (not smooth and viscid as in the rest of the order). Pollen in most of our species, especially in n. 6, exposed by the conversion of the face of the anther into a viscid, varnish-like film, which adheres to whatever touches it, carrying away some of the pollen. — Root of many tufted fibres. Leaves large, many-nerved and plaited, sheathing at the base. Flowers solitary or few, large and showy. (Name composed of Κύπρις, *Venus*, and πόδιον, *a sock* or *buskin*, i. e. *Venus's Slipper.*)

§ 1. *The three sepals separate; stem leafy; flower solitary, drooping.*

1. **C. arietìnum,** R. Br. (RAM'S-HEAD L.) Stem slender (6 – 10′ high); upper sepal ovate-lanceolate, pointed; the 2 lower and the petals linear and nearly alike (greenish-brown), rather longer than the red and whitish veiny lip (6″ long), which is somewhat pubescent, especially within, and prolonged at the apex into a short blunt conical point; leaves 3 or 4, elliptical-lanceolate, nearly smooth. — Cold swamps and damp woods, Maine to N. Y., Mich. and Minn., and northward.

§ 2. *Two of the sepals united into one under the lip.*

∗ *Stem leafy to the top, 1 – 3-flowered; lip slipper-shaped or roundish, much inflated, horizontal, and with a rounded open orifice.*

+ *Sepals and linear wavy-twisted petals brownish, pointed, longer than the lip.*

2. **C. cándidum,** Muhl. (SMALL WHITE LADY'S SLIPPER.) Slightly pubescent, 1-flowered; leaves lance-oblong, acute; petals and sepals greenish, purple-spotted; *sepals ovate-lanceolate; lip* (not 1′ long) *white,* striped with

purple inside, flattish laterally, convex above; *sterile stamen lanceolate.* — Bogs, N. Y. and Penn. to Minn., Mo., and Ky.; rare. May, June.

3. **C. parviflòrum,** Salisb. (SMALLER YELLOW L.) Stem 1 – 2° high leaves oval, pointed; *sepals ovate or ovate-lanceolate; lip flattish from above, bright yellow* (1′ long or less); sterile stamen triangular. — Bogs and low woods, Newf. to Ga., west to Minn. and E. Kan. May, June. — Flowers fragrant; sepals and petals more brown-purple than in the next, into which it seems to pass.

4. **C. pubéscens,** Willd. (LARGER YELLOW L.) Stem 2° high, pubescent, as are the broadly oval acute leaves; *sepals elongated-lanceolate; lip flattened laterally,* very convex and gibbous above, 1½ – 2′ long, *pale yellow.* — Bogs and low woods; same range as the last.

+– +– *Sepals and petals plane, rounded, white, not longer than the lip.*

5. **C. spectábile,** Salisb. (SHOWY L.) Downy, 2° high; leaves ovate, pointed; sepals round-ovate or orbicular, rather longer than the oblong petals; *lip much inflated, white, pink-purple* in front (1½′ long); sterile stamen heart-ovate. — Peat-bogs, Maine and W. New Eng. to Minn. and Mo., and south in the mountains to N. C. July. — The most beautiful of the genus.

* * *Scape naked, 2-leaved at base, 1-flowered; sepals and petals greenish, shorter than the drooping lip, which has a closed fissure down its whole length in front.*

6. **C. acaùle,** Ait. (STEMLESS L.) Downy; leaves oblong; scape 8 – 12′ high, with a green bract at top; sepals oblong-lanceolate, pointed, nearly as long as the linear petals; lip obovoid or oblong, rose-purple (rarely white), nearly 2′ long, veiny; sterile stamen rhomboid. — Dry or moist woods; Newf. to N. C., west to N. Ind., Mich., and Minn. May, June.

## ORDER 111. BROMELIÀCEÆ. (PINE-APPLE FAMILY.)

*Herbs (or scarcely woody plants, nearly all tropical), the greater part epiphytes, with persistent dry or fleshy and channelled crowded leaves, sheathing at the base, usually covered with scurf; 6-androus;* the 6-cleft perianth adherent to the ovary in the PINE-APPLE, etc., or free from it in

### 1. TILLÁNDSIA, L. LONG MOSS.

Perianth plainly double, 6-parted; the 3 outer divisions (sepals) membranaceous; the 3 inner (petals) colored; all connivent below into a tube, spreading above, lanceolate. Stamens 6, hypogynous! or the alternate ones cohering with the base of the petals; anthers introrse. Ovary free; style thread-shaped; stigmas 3. Capsule cartilaginous, 3-celled, loculicidally 3-valved; the valves splitting into an inner and an outer layer. Seeds several or many in each cell, anatropous, club-shaped, pointed, raised on a long hairy-tufted stalk, like a coma. Embryo small, at the base of copious albumen. — Scurfy-leaved epiphytes. (Named for *Prof. Tillands* of Abo.)

1. **T. usneoìdes,** L. (COMMON LONG MOSS or BLACK MOSS.) Stems thread-shaped, branching, pendulous; leaves thread-shaped; peduncle short, 1-flowered; flower yellow. — East Shore, Va., south to Fla., and westward; growing on the branches of trees, forming long hanging tufts.

## Order 112. **HÆMODORÀCEÆ.** (Bloodwort Family.)

*Herbs, with fibrous roots, usually equitant leaves, and perfect 3 – 6-androus regular flowers, which are woolly or scurfy outside; the tube of the 6-lobed perianth coherent with the whole surface, or with merely the lower part, of the 3-celled ovary.* — Anthers introrse. Style single, sometimes 3-partible; the 3 stigmas alternate with the cells of the ovary. Capsule crowned or enclosed by the persistent perianth, 3-celled, loculicidal, 3 – many-seeded. Embryo small, in hard or fleshy albumen. A small family; chiefly of the southern hemisphere.

* Ovary wholly adherent to the calyx-tube; style filiform; seeds peltate, amphitropous.

1. **Lachnanthes.** Stamens 3, exserted; anthers versatile. Leaves equitant.

* * Ovary free except at the base; style 3-partible; seeds anatropous.

2. **Lophiola.** Stamens 6, on the base of the woolly 6-cleft perianth. Leaves equitant.
3. **Aletris.** Stamens 6, in the throat of the warty-roughened and tubular 6-toothed perianth. Leaves flat, spreading.

### 1. LACHNÁNTHES, L. Red-root.

Perianth woolly outside, 6-parted down to the adherent ovary. Stamens 3, opposite the 3 larger or inner divisions; filaments long, exserted; anthers linear, fixed by the middle. Style thread-like, exserted, declined. Capsule globular. Seeds few on each fleshy placenta, flat and rounded, fixed by the middle. — Herb, with a red fibrous perennial root, equitant sword-shaped leaves, clustered at the base and scattered on the stem, which is hairy at the top and terminated by a dense compound cyme of dingy yellow and loosely woolly flowers (whence the name, from λάχνη, *wool*, and ἄνθος, *blossom*).

1. **L. tinctòria**, Ell. — Sandy swamps, near the coast, S. E. Mass., R. I., and N. J. to Fla. July – Sept.

### 2. LOPHÌOLA, Ker.

Perianth densely woolly, deeply 6-cleft; the divisions nearly equal, spreading, longer than the 6 stamens, which are inserted at their base. Anthers fixed by the base. Capsule ovate, free from the perianth except at the base, pointed with the awl-shaped style, which finally splits into 3 divisions, one terminating each valve. Seeds numerous, oblong, ribbed, anatropous. — A slender perennial herb, with creeping rootstocks and fibrous roots, linear and nearly smooth equitant leaves; the stem leafless and whitened with soft matted wool toward the summit, as also the crowded or panicled cyme. Perianth dingy yellow inside; the lobes naked only toward the tip, each clothed with a woolly tuft near the base (whence the name, from λοφεῖον, *a small crest*).

1. **L. aùrea**, Ker. — Boggy pine-barrens, N. J. to Fla. June – Aug.

### 3. ÁLETRIS, L. Colic-root. Star-grass.

Perianth cylindrical, not woolly, but wrinkled and roughened outside by thickly-set points which look like scurfy mealiness, the tube cohering below with the base only of the ovary, 6-cleft at the summit. Stamens 6, inserted at the base of the lobes; filaments and anthers short, included. Style awl-shaped, 3-cleft at the apex; stigmas minutely 2-lobed. Capsule ovate, enclosed in the roughened perianth; the dehiscence, seeds, etc., nearly as in Lophiola. — Perennial and smooth stemless herbs, very bitter, with fibrous roots, and a spreading cluster of thin and flat lanceolate leaves; the small flowers in a wand-like spiked raceme, terminating a naked slender scape (2 – 3° high). Bracts awl-shaped, minute. (Ἀλετρίς, a female slave who grinds corn; the name applied to these plants in allusion to the apparent mealiness dusted over the blossoms.)

1. **A. farinòsa,** L. Flowers oblong-tubular, white; lobes lanceolate-oblong. — Grassy or sandy woods, Mass. to Fla., Ill., and Minn. July, Aug.

2. **A. aùrea,** Walt. Flowers bell-shaped, yellow (fewer and shorter); lobes short-ovate. — Barrens, N. J. to Fla. July.

## ORDER 113. IRIDÀCEÆ. (IRIS FAMILY.)

*Herbs, with equitant 2-ranked leaves, and regular or irregular perfect flowers; the divisions of the 6-cleft petal-like perianth convolute in the bud in 2 sets, the tube coherent with the 3-celled ovary, and 3 distinct or monadelphous stamens, alternate with the inner divisions of the perianth, with extrorse anthers.* — Flowers from a spathe of 2 or more leaves or bracts, usually showy. Style single, usually 3-cleft; stigmas 3, opposite the cells of the ovary, or 6 by the parting of the style-branches. Capsule 3-celled, loculicidal, many-seeded. Seeds anatropous; embryo straight in fleshy albumen. Rootstocks, tubers, or corms mostly acrid.

* Branches of the style (or stigmas) opposite the anthers.

1. **Iris.** Outer divisions of the perianth recurved, the inner erect; stigmas petal-like.

* * Branches of the style alternate with the anthers. Perianth regular.

2. **Nemastylis.** Stem from a coated bulb. Filaments united. Style-branches 2-cleft.
3. **Belamcanda.** Stems from a creeping rhizome. Filaments distinct. Stigmas dilated.
4. **Sisyrinchium.** Root fibrous. Filaments united. Stigmas thread-like.

### 1. ÌRIS, Tourn. FLOWER-DE-LUCE.

Perianth 6-cleft; the tube more or less prolonged beyond the ovary; the 3 outer divisions spreading or reflexed, the 3 inner smaller, erect. Stamens distinct; the oblong or linear anthers sheltered under the overarching petal-like stigmas (or rather branches of the style, bearing the true stigma in the form of a thin lip or plate under the apex); most of the style connate with the tube of the perianth. Capsule 3 – 6-angled, coriaceous. Seeds depressed-flattened, usually in 2 rows in each cell. — Perennials, with sword-shaped or grassy leaves, and large showy flowers; ours with creeping and more or less tuberous rootstocks. (Ἶρις, the *rainbow*, anciently applied to this genus on account of its bright and varied colors.)

* *Stems leafy and rather tall* (1 – 3° *high*), *from thickened rootstocks, often branching; tube of the perianth shorter than the divisions, which are beardless and crestless, the erect inner ones* (*petals*) *much smaller than the outer.*

+ *Flowers violet-blue, variegated with green, yellow or white, and purple-veined.*

1. **I. versícolor,** L. (LARGER BLUE FLAG.) Stem stout, angled on one side; *leaves sword-shaped* (¾′ wide); ovary obtusely triangular with the sides flat; flowers (2½ – 3′ long) short-peduncled, the funnel-form tube shorter

than the ovary; capsule oblong, turgid, with rounded angles. — Wet places, Newf. to Fla., west to Minn. and Ark. May, June.

2. **I. prismática**, Pursh. (SLENDER BLUE FLAG.) Stem *very slender*, terete; *leaves narrowly linear* (2 – 3″ wide); flowers slender-peduncled (1½ – 2′ long), the tube extremely short; ovary 3-angled, each side 2-grooved; capsule sharply triangular. (I. Virginica, *Man.;* not *L.*) — Marshes near the coast, Maine to N. C. June.

**I.** CAROLINIÀNA, Watson, resembling n. 1, but with longer laxer and greener leaves, and the very large seeds in one row in each cell, probably occurs in S. Va.

+ + *Flowers copper-colored or dull reddish-brown; petals widely spreading.*

3. **I. fúlva**, Ker. Stem and leaves as n. 1; tube of the perianth cylindrical, as long as the 6-angled ovary; style-branches narrow. (I. cuprea, *Pursh.*) — Swamps, S. Ill. and Mo. to La. and Ga. May.

* * *Stems low* (3 – 6′ *high*), *from tufted and creeping slender* (*or here and there tuberous-thickened*) *rootstocks*, 1 – 3-*flowered; tube of the perianth long and slender; the violet-blue divisions nearly equal.*

4. **I. vérna**, L. (DWARF IRIS.) *Leaves linear*, grass-like, rather glaucous; the thread-like tube of the perianth about the length of the divisions, which are oblong-obovate and on *slender claws*, the outer ones slightly hairy down the orange-yellow base, *crestless;* capsule obtusely triangular. — Wooded hillsides, Lancaster Co., Penn., to S. C., west to Ky. and Ala. April. — Flowers sometimes white with yellowish centre.

5. **I. cristàta**, Ait. (CRESTED DWARF IRIS.) *Leaves lanceolate* (3 – 5′ long when grown); those of the spathe *ovate-lanceolate*, shorter than the *thread-like tube of the perianth*, which is 2′ long and *much longer than the* light blue obovate short-clawed *divisions*, the outer ones *crested* but beardless; capsule sharply triangular. — In the mountains from Md. to N. C.; Trumbull Co., Ohio (*Ingraham*); knobs of S. Ind. May. — Flowers fragrant.

6. **I. lacústris**, Nutt. (LAKE DWARF IRIS.) *Tube of the perianth rather shorter than the divisions* (yellowish, ½ – ¾′ long), *dilated upward*, not exceeding the spathe; otherwise as in the last, and too near it. — Gravelly shores of Lakes Huron and Michigan. May.

**I.** PSEUDÁCORUS, L., the YELLOW IRIS of European marshes, with very long linear leaves and bright yellow beardless flowers, is reported as having become established in Mass. and N. Y.

## 2. NEMÁSTYLIS, Nutt.

Perianth spreading, the segments similar and nearly equal. Filaments more or less united into a tube. Style short, its slender 2-parted branches alternate with the anthers and exserted between them; stigmas minute, terminal. Capsule oblong or ovate, truncate, dehiscent at the summit. Seeds globose or angled. — Stems terete, from coated bulbs, with few plicate leaves, and few fugacious flowers from 2-bracted spathes. (Name from νῆμα, *a thread*, and στυλίς, *style*, for the slender style-branches.)

1. **N. geminiflòra**, Nutt. Stem 1 – 2° high; spathes 2-flowered; perianth pale blue-purple, 1 – 2′ broad, the divisions oblong-obovate; capsule obovate, ½′ long. — E. Kan. to Tex.

### 3. BELAMCÁNDA, Adans. BLACKBERRY-LILY.

Perianth 6-parted almost to the ovary; the divisions widely and equally spreading, all nearly alike, oblong with a narrowed base, naked. Stamens monadelphous only at base; anthers oblong. Style club-shaped, 3-cleft, the narrow divisions tipped with a small dilated stigma. Capsule pear-shaped; the valves at length falling away, leaving the central column covered with the globose black and fleshy-coated seeds, imitating a blackberry (whence the popular name). — Perennial, with rootstocks, foliage, etc., of an Iris; the branching stems (3 – 4° high) loosely many-flowered; the orange-yellow perianth mottled above with crimson-purple spots. (An East Indian name of the species.)

**B.** CHINÉNSIS, Adans. (Pardanthus Chinensis, *Ker.*) — Sparingly escaped from gardens, Md. to S. Ind. and Mo. (Adv. from China, etc.)

### 4. SISYRÍNCHIUM, L. BLUE-EYED GRASS.

Perianth 6-parted; the divisions alike, spreading. Stamens monadelphous to the top. Stigmas thread-like. Capsule globular, 3-angled. Seeds globular. — Low slender perennials, with fibrous roots, grassy or lanceolate leaves, mostly branching 2-edged or winged stems, and fugacious umbelled-clustered small flowers from a 2-leaved spathe. (A meaningless name, of Greek origin.)

1. **S. angustifòlium,** Mill. Scape (4 – 12′ high) winged or wingless, *simple, the spathe solitary* and terminal, its outer bract more or less elongated; flowers delicate blue, changing to purplish (rarely white), the divisions of the perianth more or less notched, bristle-pointed and ciliate; mature *seeds* globose, *large* (½″ broad), faintly pitted or *nearly smooth.* (S. Bermudiana, var. mucronatum, *Gray*, excl. descr.) — Moist meadows, etc., among grass; common everywhere. June – Aug.

2. **S. ánceps,** Cav. Scape (6 – 18′ high) usually branching and bearing 2 or more peduncled spathes; seeds more ovate, much smaller, deeply pitted. (S. Bermudiana, var. anceps, *Gray*, excl. descr.) — Similar localities; common.

## ORDER 114. AMARYLLIDÀCEÆ. (AMARYLLIS FAMILY.)

*Chiefly bulbous and scape-bearing herbs, not scurfy or woolly, with linear flat root-leaves, and regular (or nearly so) and perfect 6-androus flowers, the tube of the corolline 6-parted perianth coherent with the 3-celled ovary; the lobes imbricated in the bud.* — Anthers introrse. Style single. Capsule 3-celled, several – many-seeded. Seeds anatropous or nearly so, with a straight embryo in the axis of fleshy albumen. — An order represented in our gardens by the *Narcissus*, *Daffodil*, *Snowdrop*, etc., but with very few indigenous representatives in this country. Bulbs acrid. Differs from Liliaceæ chiefly in the inferior ovary.

* Capsule 3-valved, loculicidal; anthers versatile; perianth funnel-shaped; glabrous.

1. **Zephyranthes.** Flower naked in the throat; the tube short or none. Bulbs coated.
2. **Hymenocallis.** Flower with a slender tube and narrow recurved lobes; a cup-shaped crown connecting the stamens. Bulbs coated.
3. **Agave.** Flower equally 6-cleft, persistent, no crown. Fleshy-leaved, not bulbous.

* * Capsule indehiscent; anthers sagittate; villous.

4. **Hypoxis.** Perianth 6-parted nearly down to the ovary, persistent. Bulb solid.

## 1. ZEPHYRÁNTHES, Herb.

Perianth funnel-form, from a tubular base; the 6 divisions petal-like and similar, spreading above; the 6 stamens inserted in its naked throat; anthers versatile. Pod membranaceous, 3-lobed. — Leaves and low scape from a coated bulb. Flowers solitary from a scarious simple bract. (From ζέφυρος, *a wind*, and ἄνθος, *flower*.)

1. **Z. Atamásco,** Herb. (ATAMASCO LILY.) Leaves bright green and shining, very narrow, channelled, the margins acute; scape 6 – 12′ high; peduncle short; spathe 2-cleft at the apex; perianth white and pink, 3′ long; stamens and style declined. — Penn. to Va. and Fla. June.

## 2. HYMENOCÁLLIS, Salisb.

Perianth with a long and slender tube, and an equal 6-parted limb; lobes long and narrow, recurved; the throat bearing a tubular or cup-shaped corollike delicate crown, which connects the bases of the 6 exserted stamens. Anthers linear, versatile. Capsule thin, 2 – 3-lobed; seeds usually 2 in each cell, basal, fleshy, often like bulblets. — Scapes and leaves from a coated bulb. Flowers white, fragrant, large and showy, sessile in an umbel-like head or cluster, subtended by 2 or more scarious bracts. (Name composed of ὑμήν, *a membrane*, and κάλλος, *beauty*.)

1. **H. occidentàlis,** Kunth. Leaves strap-shaped, glaucous, 1 – 1½° long, 9 – 18″ broad; scape 3 – 6-flowered; bracts narrow, 2′ long; perianth-tube about 2½ – 4′ long, the linear segments scarcely shorter; the crown 12 – 15″ long, tubular below, broadly funnel-form above, the margin deltoid and entire, or 2-toothed and erose, between the white filaments, which are twice longer; anthers yellow; style green. — Marshy banks of streams, S. Ill. to N. Ga. and Ala. — Apparently distinct from H. lacera, *Salisb.* (Pancratium rotatum, *Ker*), of the southern coast.

## 3. AGÀVE, L. AMERICAN ALOE.

Perianth tubular-funnel-form, persistent, 6-parted; the divisions nearly equal, narrow. Stamens 6; anthers linear, versatile. Capsule coriaceous, many-seeded. Seeds flattened. — Leaves thick and fleshy, often with cartilaginous or spiny teeth, clustered at the base of the many-flowered scape, from a thick fibrous-rooted crown. (Name from ἀγαυή, *noble*, — not inappropriate as applied to A. AMERICANA, the CENTURY-PLANT.)

1. **A. Virgínica,** L. (FALSE ALOE.) Herbaceous; leaves entire or denticulate; scape 3 – 6° high; flowers scattered in a loose wand-like spike, greenish-yellow, fragrant, the perianth 9 – 12″ long, its narrow tube twice longer than the erect lobes. — Dry or rocky banks, Md. and Va. to Fla., west to S. Ind., Mo., and Tex.

## 4. HYPÓXIS, L. STAR-GRASS.

Perianth persistent, 6-parted, spreading; the 3 outer divisions a little herbaceous outside. Stamens 6; anthers sagittate, erect. Capsule crowned with the withered or closed perianth, not opening by valves. Seeds globular, with a crustaceous coat, ascending, imperfectly anatropous, the rhaphe not adherent quite down to the micropyle, the persistent seed-stalk thus forming a sort of lateral beak. Radicle inferior! — Stemless small herbs, with grassy and hairy linear leaves and slender few-flowered scapes, from a solid bulb. (An old name for a plant having sourish leaves, from *ὕποξυς, sub-acid*.)

1. **H. erécta,** L. Leaves linear, grass-like, longer than the umbellately 1–4-flowered scape; divisions of the perianth hairy and greenish outside, yellow within. — Meadows and open woods, N. Eng. to Fla., west to Minn., E. Kan., and Tex.

## Order 115. DIOSCOREÀCEÆ. (Yam Family.)

*Plants with twining stems from large tuberous roots or knotted rootstocks, and ribbed and netted-veined petioled leaves, small diœcious 6-androus and regular flowers, with the 6-cleft calyx-like perianth adherent in the fertile plant to the 3-celled ovary. Styles 3, distinct.* — Ovules 1 or 2 in each cell, anatropous. Fruit usually a membranaceous 3-angled or winged capsule. Seeds with a minute embryo in hard albumen.

### 1. DIOSCORÈA, Plumier. Yam.

Flowers very small, in axillary panicles or racemes. Stamens 6, at the base of the divisions of the 6-parted perianth. Capsule 3-celled, 3-winged, loculicidally 3-valved by splitting through the winged angles. Seeds 1 or 2 in each cell, flat, with a membranaceous wing. (Dedicated to the Greek naturalist, *Dioscorides*.)

1. **D. villòsa,** L. (Wild Yam-root.) Herbaceous. Stems slender, from knotty and matted rootstocks, twining over bushes; leaves mostly alternate, sometimes nearly opposite or in fours, more or less downy beneath, heart-shaped, conspicuously pointed, 9–11-ribbed; flowers pale greenish-yellow, the sterile in drooping panicles, the fertile in drooping simple racemes; capsules 8–10″ long. — Thickets, S. New Eng. to Fla., west to Minn., Kan., and Tex.

## Order 116. LILIÀCEÆ. (Lily Family.)

*Herbs, or rarely woody plants, with regular and symmetrical almost always 6-androus flowers; the perianth not glumaceous, free from the chiefly 3-celled ovary; the stamens one before each of its divisions or lobes* (i. e. 6, in one instance 4), *with 2-celled anthers; fruit a few–many-seeded pod or berry; the small embryo enclosed in copious albumen.* Seeds anatropous or amphitropous (orthotropous in Smilax). Flowers not from a spathe, except in Allium; the outer and inner ranks of the perianth colored alike (or nearly so) and generally similar, except in Trillium.

Suborder I. **Smilaceæ.** Shrubby or rarely herbaceous, the petiole of the 3-9-nerved netted-veined leaves often tendril-bearing. Flowers (in ours) diœcious, in axillary umbels, small, with regular 6-parted deciduous perianth. Anthers apparently 1-celled. Stigmas 3, sessile. Fruit a 3-celled berry, with 1–2 pendulous orthotropous seeds in each cell. Embryo minute in horny albumen.

1. **Smilax.** Characters as above.

SUBORDER II. **Liliaceæ** proper. Never climbing by tendrils. Very rarely diœcious. Seeds anatropous or amphitropous.

SERIES A. Floral bracts scarious. Stamens perigynous on the usually withering-persistent nerved perianth; anthers introrse. Style undivided, mostly persistent. Fruit a loculicidal capsule or a berry. Leaves transversely veined.

* Scape from a coated bulb; fruit capsular; leaves linear.

+ Flowers umbellate; segments 1-nerved; pedicels not jointed.

2. **Allium.** Perianth 6-parted. Capsule deeply lobed, often crested; cells 1–2-seeded. Very alliaceous.
3. **Nothoscordum.** Perianth 6-parted. Seeds several in each cell. Not alliaceous.
4. **Androstephium.** Perianth tubular-funnel-form. Filaments in the throat, united into a crown.

+ + Flowers racemose, 6-parted, the segments 3 - several-nerved.

5. **Camassia.** Flowers light blue, long-racemose. Filaments filiform.
6. **Ornithogalum.** Flowers greenish white, sub-corymbose. Filaments dilated.

+ + + Flowers densely racemose; perianth urn-shaped, 6 toothed.

7. **Muscari.** Flowers deep blue, small. Stamens included.

* * Stem or scape not from a bulb, several-flowered; capsule many-seeded.

8. **Hemerocallis.** Scape from a fleshy-fibrous root. Flowers few, large, yellow, tubular-funnel-form; limb 6-parted. Stamens and long style declined. Seeds globose.
9. **Yucca.** Stem woody, leafy. Flowers white, campanulate, 6-parted. Stigmas sessile. Seeds flat.

* * * Leafy stems (scape in n. 10) from running rootstocks; fruit a berry; leaves cordate to lanceolate (except n. 12); flowers white; pedicels jointed.

+ Perianth gamophyllous, 6-lobed.

10. **Convallaria.** Leaves sheathing the scape. Flowers racemose; perianth bell-shaped.
11. **Polygonatum.** Stem leafy. Flowers axillary; perianth cylindrical.

+ + Perianth-segments distinct, small, spreading, persistent.

12. **Asparagus.** Stems branching, the apparent leaves thread-like. Flowers axillary.
13. **Smilacina.** Stem simple, leafy. Flowers 6-parted, racemose or paniculate.
14. **Maianthemum.** Stem low, 2-leaved. Flowers 4-merous, racemose.

SERIES B. Floral bracts none or foliaceous. Stamens hypogynous or at the base of the distinct segments of the deciduous perianth (persistent in n. 23); anthers extrorse or dehiscent laterally. Style undivided, deciduous (stigmas sessile and persistent in n. 23). Fruit a loculicidal capsule or a berry. Veinlets anastomosing (transverse in n. 15, 17–19).

* Fruit a berry; stem or scape from a creeping rootstock; leaves broad, alternate or radical; flowers narrowly campanulate.

15. **Streptopus.** Stem leafy. Flowers axillary, on bent pedicels. Anthers sagittate, acute; filaments deltoid or subulate.
16. **Disporum.** Stem leafy. Flowers few, in terminal umbels. Anthers oblong, obtuse; filaments slender. Veinlets anastomosing.
17. **Clintonia.** Flowers umbellate on a scape, few or many.

* * Fruit a capsule.

+ Stems leafy, from a short or creeping rootstock; flowers few, solitary, pendulous; capsule few-seeded.

18. **Uvularia.** Stem terete. Leaves perfoliate. Flowers terminal. Capsule truncate, 3-lobed.
19. **Oakesia.** Stem angled. Leaves sessile. Flowers opposite the leaves. Capsule acutely 3-winged.

+ + Stem or scape from a bulb or corm; capsule many-seeded.

20. **Erythronium.** Scape from a solid bulb, with a pair of leaves. Flower solitary. Seeds angled, obovoid.
21. **Lilium.** Stem leafy from a scaly bulb. Seeds horizontal, flattened.

* * * Fruit a berry; stem from a tuber-like rootstock, bearing 1 or 2 whorls of leaves; flowers terminal; stigmas sessile.

22. **Medeola.** Leaves in 2 whorls. Flowers umbellate. Perianth-segments similar, colored, deciduous.
23. **Trillium.** Leaves (3) in a terminal whorl. Flower solitary; outer sepals leaf-like, persistent.

SERIES C. Floral bracts green or greenish (rarely scarious), or none. Stamens at the base of the distinct 1 – several-nerved persistent perianth-segments; anthers small, versatile. Styles or sessile stigmas distinct. Capsule mostly septicidal. Seeds with a loose testa or appendaged. Leaves with transverse veinlets (except in n. 24 and 25).

* Stems leafy or bracteate, from a thick tuberous rootstock; flowers racemose; anthers 2-celled; stigmas linear.

24. **Helonias.** Leaves radical, oblanceolate. Flowers perfect. Capsule broadly obovate, many-seeded.
25. **Chamælirium.** Stem very leafy. Flowers diœcious. Capsule oblong, many-seeded.
26. **Xerophyllum.** Stem very leafy; leaves very narrow. Flowers perfect. Capsule few-seeded.

* * Stems distichously equitant-leafy, from a creeping rootstock; flowers on bracteolate pedicels, racemose; anthers 2-celled; stigmas small, terminal; seeds often appendaged.

27. **Tofieldia.** Bractlets 3, verticillate. Styles short. Seeds horizontal.
28. **Narthecium.** Bractlet linear. Stigma slightly lobed. Seeds ascending.

* * * Anthers heart- or kidney-shaped, confluently 1-celled, and peltate after opening; stigmas terminal; capsule 3-beaked by the persistent styles; seeds angled or flattened and margined.

+ Stems tall, leafy, from a thick rootstock, pubescent above; flowers polygamous, racemose-paniculate; seeds flat, winged.

29. **Melanthium.** Sepals free from the ovary, their long claws bearing the filaments.
30. **Veratrum.** Sepals without claws, slightly adnate to the ovary. Leaves strongly nerved and plicate.

+ + Root mostly bulbous; glabrous; flowers racemose or panicled; seeds narrow, angled; leaves linear.

31. **Stenanthium.** Sepals lanceolate, acuminate, without glands.
32. **Zygadenus.** Sepals oblong to ovate, glandular toward the base.
33. **Amianthium.** Flowers in a dense raceme. Sepals ovate-oblong, glandless, free from the ovary. Cells of the capsule widely divergent, 1 – 2-seeded.

### 1. SMÌLAX, Tourn. GREENBRIER. CAT-BRIER.

Flowers diœcious in umbels or axillary peduncles, small, greenish or yellowish, regular, the perianth-segments distinct, deciduous. Filaments linear, inserted on the very base, the introrse anthers linear or oblong, fixed by the base, apparently 1-celled. Ovary of fertile flowers 3-celled (1-celled, with single stigma, in n. 11); stigmas thick and spreading, almost sessile; ovules 1 or 2 in each cell, pendulous, orthotropous; fruit a small berry. — Shrubby or rarely herbaceous, usually climbing or supported by a pair of tendrils on the petiole of the ribbed and netted-veined simple leaves. (The ancient Greek name, of obscure meaning.)

§ 1. *Stems herbaceous, not prickly; flowers carrion-scented; ovules 2 in each cell; leaves membranous, mucronate-tipped; berries bluish-black with a bloom.*

1. **S. herbàcea,** L. (Carrion-Flower.) Stem climbing, 3 – 15° high; *leaves ovate or rounded, mostly heart-shaped* or truncate at base, abruptly acute to short-acuminate, 7 – 9-*nerved*, smooth; petioles ½ – 1′ long; peduncles elongated (3 – 4′ long, or sometimes even 6 – 8′ and much longer than the leaves), 20 – 40-flowered; seeds 6. — Moist meadows and river-banks; common, from the Atlantic to Minn., Mo., and Tex. June. Very variable. — Var. pulverulénta, Gray, has the leaves more or less soft-downy beneath.

2. **S. tamnifòlia,** Michx. Stem upright or climbing; leaves *mostly* 5-*nerved*, smooth, broadly ovate to lanceolate, truncate or cordate at base, abruptly acute to acuminate, some of them *hastate with broad rounded lobes;* peduncles longer than the petioles; berry smaller, 2 – 3-seeded. — Pine-barrens, N. J. to S. C.

3. **S. ecirrhàta,** Watson. Erect, ½ – 3° high, *without tendrils* (or only the uppermost petioles tendril-bearing), glabrous; lower leaves reduced to narrow scale-like bracts, the rest thin, 5 – 7-nerved, *broadly ovate-elliptical* to roundish, acute, mostly cordate at base, 2 – 5′ long, sometimes verticillate, sparsely pubescent beneath; peduncles about equalling the petioles (1 – 2½′ long), on the lower part of the stem; umbels 10 – 20-flowered; berry 3-seeded. — Md. to S. C., west to Mich. and Mo. May, June.

§ 2. *Stems woody, often prickly; ovules solitary; glabrous throughout.*

* *Leaves ovate or roundish, etc., most of them rounded or heart-shaped at base, and 5 – 9-nerved, the three middle nerves or ribs stronger and more conspicuous.*

+ *Peduncles shorter or scarcely longer than the petioles* (2 – 6″), *flattened; leaves thickish, green both sides.*

4. **S. Wálteri,** Pursh. Stem low, somewhat angled, prickly near the base or unarmed; *leaves ovate to ovate-lanceolate or oblong, somewhat heart-shaped* or rounded at base (3 – 4′ long); *berries coral-red.* — Pine barrens, N. J. to Fla.

5. **S. rotundifòlia,** L. (Common Greenbrier. Horse-brier.) Stem armed with scattered prickles, as well as the terete branches; branchlets more or less 4-angular; *leaves ovate or round-ovate,* often broader than long, slightly heart-shaped, abruptly short-pointed (2 – 3′ long); *berries blue-black,* with a bloom. — Moist thickets, N. Eng. to Ga., west to Minn. and Tex. Very variable, passing into var. quadrangulàris, Gray, which has branches, and especially branchlets, 4-angular, and is more common west.

+ + *Peduncle longer than but seldom twice the length of the short petiole, flattened; leaves tardily deciduous or partly persistent; berries black, with a bloom.*

6. **S. glaùca,** Walt. Terete branches and somewhat 4-angular branchlets armed with scattered stout prickles, or naked; *leaves ovate,* rarely subcordate, *glaucous beneath* and sometimes also above, as well as the branchlets when young (about 2′ long), abruptly mucronate, the edges smooth and naked. — Dry thickets, E. Mass. to Fla., west to S. Ind., Mo., and Tex.

7. **S. bòna-nox,** L. Branches and the angular (often square) branchlets sparsely armed with short rigid prickles; *leaves* varying from round-heart-shaped and slightly contracted above the dilated base to fiddle-shaped and halberd-shaped or 3-lobed, *green and shining both sides,* cuspidate-pointed, the

margins often somewhat bristly-ciliate or spinulose. (S. tamnoides, *Man.;* probably not *L.*) — Thickets; Nantucket, Mass. (*L. L. Dame*); N. J. to Fla., west to Ill., Mo., and Tex.

+ + + *Peduncle* 2 – 4 *times the length of the petiole; leaves ample* (3 – 5′ *long*), *thin or thinnish, green both sides; berries black; stem terete and branchlets nearly so.*

8. **S. híspida,** Muhl. Rootstock cylindrical, elongated; stem (climbing high) below densely *beset with long and weak blackish bristly prickles,* the flowering branchlets mostly naked; *leaves* ovate and the larger heart-shaped, pointed, slightly rough-margined, *membranaceous and deciduous;* peduncles 1½ – 2′ long; sepals lanceolate, almost 3″ long. — Moist thickets, Conn. to Va., west to Minn. and Tex. June.

9. **S. Pseùdo-China,** L. *Rootstock tuberous; stems and branches unarmed,* or with very few weak prickles; leaves ovate-heart-shaped, or on the branchlets ovate-oblong, cuspidate-pointed, often rough-ciliate, becoming firm in texture; peduncles flat (2 – 3′ long). — Dry or sandy soil, N. J. to Fla., west to S. Ind. and Mo. July.

* * *Leaves varying from oblong-lanceolate to linear, narrowed at base into a short petiole,* 3 – 5-*nerved, shining above, paler or glaucous beneath, many without tendrils; peduncles short, seldom exceeding the petioles, terete; the umbels sometimes panicled; branches terete, unarmed.*

10. **S. lanceolàta,** L. *Leaves thinnish,* rather deciduous, ovate-lanceolate or lance-oblong; *stigmas* 3; *berries dull red.* — Rich woods and margins of swamps, Va. to Fla., west to Ark. and Tex. June.

11. **S. laurifòlia,** L. *Leaves thick and coriaceous, evergreen,* varying from oblong-lanceolate to linear (2½ – 5′ long); *stigmas solitary* and *ovary* 1-*celled; berries black* when ripe, 1-seeded, maturing in the second year. — Pine-barrens, N. J. to Fla., west to Ark. and La. July, Aug.

## 2. ÁLLIUM, L. ONION. GARLIC.

Perianth of 6 entirely colored sepals, which are distinct, or united at the very base, 1-nerved, often becoming dry and scarious and more or less persistent; the 6 filaments awl-shaped or dilated at base. Style persistent, but jointed upon the very short axis of the ovary, thread-like; stigma simple. Capsule lobed, loculicidal, 3-valved, with 1 – 2 ovoid-kidney-shaped amphitropous or campylotropous black seeds in each cell. — Strong-scented and pungent stemless herbs; the leaves and scape from a coated bulb; flowers in a simple umbel, some of them frequently changed to bulblets; spathe scarious, 1 – 2-valved. (The ancient Latin name of the Garlic.)

§ 1. *Bulbs cespitose, narrowly oblong and crowning a rhizome; coats membranous.*

* *Leaves* (2 or 3) *elliptic-lanceolate; ovules solitary in each cell.*

1. **A. tricóccum,** Ait. (WILD LEEK.) Scape naked (4 – 12′ high from clustered pointed bulbs, 2′ long), bearing an erect many-flowered umbel; leaves 5 – 9′ long, 1 – 2′ wide; sepals oblong (greenish white), equalling the nearly distinct filaments; capsule strongly 3-lobed. — Rich woods, W. N. Eng. to Minn. and Iowa, south in the mountains to N. C. Leaves appearing in early spring and dying before the flowers are developed.

* * *Leaves linear; ovules a pair in each cell.*

2. **A. Schœnóprasum,** L. (Chives.) Scape naked or leafy at base (6 – 12′ high), bearing a globular *capitate umbel* of many rose-purple flowers; sepals lanceolate, pointed, longer than the simple downwardly dilated filaments; *leaves awl-shaped, hollow; capsule not crested.* — From N. Brunswick and the Great Lakes to the Pacific. (Eu., Asia.)

3. **A. cérnuum,** Roth. (Wild Onion.) *Scape naked, angular* (½ – 2° high), nodding at the apex, bearing a *loose or drooping few – many-flowered umbel; leaves linear, flattened, sharply keeled* (1° long); sepals oblong-ovate, acute (rose-color), shorter than the slender filaments and style; *capsule* 6-*crested.* — In the Alleghanies to S. C., west to Minn., Mo., Tex., and westward.

§ 2. *Bulbs mostly solitary, not rhizomatous; coats often fibrous; leaves narrowly linear, flat or channelled* (*terete in* A. vineale).

4. **A. stellàtum,** Fras. *Scape terete* (6 – 18′ high), slender, bearing an *erect umbel;* bulb-coats membranous; *sepals broad,* acute; *stamens and style exserted; capsule prominently* 6-*crested.* — Rocky slopes, Minn. to W. Ill. and Mo., and westward.

5. **A. reticulàtum,** Fraser. Scape 3 – 8′ high; *bulbs densely and coarsely fibrous-coated;* spathe 2-valved; umbel rarely bulbiferous; sepals ovate- to narrowly lanceolate, *thin and lax* in fruit, *a third longer than the stamens; capsule crested.* — Sask. to Iowa and N. Mex.

6. **A. Nuttàllii,** Watson. Scape 4 – 6′ high, from a *very fibrous-coated bulb;* spathe usually 3-valved; sepals usually broader, *rather rigid* in fruit; *capsule not crested.* — Central Kan. to Tex., and westward.

7. **A. Canadénse,** Kalm. (Wild Garlic.) Scape 1° high or more; bulb-coats somewhat fibrous; *umbel densely bulbiferous* or few-flowered; sepals narrowly lanceolate, obtusish, equalling or exceeding the stamens; *capsule not crested.* — Moist meadows, N. Eng. to Minn., south to the Gulf. May, June.

**A.** vineàle, L. (Field Garlic.) Scape slender, clothed with the sheathing bases of the leaves below the middle (1 – 3° high); *leaves terete and hollow,* slender, channelled above; *umbel often densely bulbiferous; filaments much dilated, the alternate ones cuspidate* on each side of the anther. — Moist meadows and fields; a vile weed eastward. June. (Nat. from Eu.)

## 3. NOTHÓSCORDUM, Kunth.

Flowers greenish or yellowish white. Capsule oblong-obovate, somewhat lobed, obtuse, with the style obscurely jointed on the summit; cells several-ovuled and -seeded. Filaments filiform, distinct, adnate at base. Bulb tunicated, not alliaceous. Otherwise as in Allium. (Name from νόθος, *false,* and σκόρδιον, *garlic.*)

1. **N. striàtum,** Kunth. Scape 1° high or less; bulb small, often bulbiferous at base; leaves narrowly linear; flowers few, on slender pedicels, the segments narrowly oblong, 4 – 6″ long; ovules 4 – 7 in each cell. (Allium striatum, *Jacq.*) — Prairies and open woods, Va. to Ind., Neb., and southward.

## 4. ANDROSTÉPHIUM, Torr.

Perianth funnel-form, the cylindrical tube equalling the somewhat spreading limb or shorter; segments 1-nerved. Stamens 6, in one row upon the throat;

the filaments united to form an erect tubular crown, with bifid lobes alternate with the oblong versatile anthers. Capsule sessile, subglobose-triquetrous, beaked by the stout persistent style; seeds large, few to several in each cell. — Scape and linear leaves from a membranous- or fibrous-coated corm; pale lilac flowers umbellate; pedicels not jointed; involucral bracts several. (Name from ἀνήρ, for *stamen*, and στέφος, *crown*, referring to the stamineal crown.)

1. **A. violàceum,** Torr. Scape 2 - 6′ high; flowers 8 - 12″ long or more, usually exceeding the stout pedicels, the tube nearly as long as the limb; crown scarcely shorter than the limb. — Kan. to Tex.

## 5. CAMÁSSIA, Lindl.

Perianth of 6 colored (blue or purple) spreading sepals, 3 - 7-nerved, slightly irregular, mostly deciduous; the 6 filiform filaments at their base. Style thread-like, the base persistent. Capsule oblong or obovate, 3-angled, loculicidal, 3-valved, with several black roundish seeds in each cell. — Scape and linear leaves from a coated bulb; the flowers in a simple raceme, mostly bracted, on jointed pedicels. (From the native Indian name *quamash* or *camass.*)

1. **C. Fràseri,** Torr. (EASTERN CAMASS. WILD HYACINTH.) Scape 1° high or more; leaves keeled; raceme elongated; bracts longer than the pedicels; sepals pale blue, 3-nerved, 4 - 7″ long; capsule acutely triangular-globose. (Scilla Fraseri, *Gray.*) — Rich ground, W. Penn. to Minn. and E. Kan., and in the mountains to Ga.

## 6. ORNITHÓGALUM, Tourn. STAR-OF-BETHLEHEM.

Perianth of 6 colored (white) spreading 3 - 7-nerved sepals. Filaments 6, flattened-awl-shaped. Style 3-sided; stigma 3-angled. Capsule membranous, roundish-angular, with few dark and roundish seeds in each cell, loculicidal. — Scape and linear channelled leaves from a coated bulb. Flowers corymbed, bracted; pedicels not jointed. (An ancient whimsical name from ὄρνις, *a bird*, and γάλα, *milk.*)

**O.** UMBELLÀTUM, L. Scape 4 - 9′ high; flowers 5 - 8, on long and spreading pedicels; sepals green in the middle on the outside. — Escaped from gardens. (Nat. from Eu.)

**O.** NÙTANS, L. Scape 1° high or more; flowers 5 or 6, large (1′ long), nodding on very short pedicels; filaments very broad. — Rarely escaped from gardens; Penn. (Adv. from Eu.)

## 7. MUSCÀRI, Tourn. GRAPE-HYACINTH.

Perianth globular or ovoid, minutely 6 toothed (blue). Stamens 6, included; anthers short, introrse. Style short. Capsule loculicidal, with 2 black angular seeds in each cell. — Leaves and scape (in early spring) from a coated bulb; the small flowers in a dense raceme, sometimes musk-scented (whence the name).

**M.** BOTRYOÌDES, Mill. Leaves linear, 3 - 4″ broad; flowers globular (1 - 1½″ long), deep blue, appearing like minute grapes. — Escaped from gardens into copses and fence-rows. (Adv. from Eu.)

**M.** RACEMÒSUM, Mill. Leaves 1 - 1½″ broad; flowers oblong-urceolate, 2 - 2½″ long, deep blue, fragrant. — Rare escape, Md. and Penn. (Adv. from Eu.)

## 8. HEMEROCÁLLIS, L. DAY-LILY.

Perianth funnel-form, lily-like; the short tube enclosing the ovary, the spreading limb 6-parted; the 6 stamens inserted on its throat. Anthers as in

Lilium, but introrse. Filaments and style long and thread-like, declined and ascending; stigma simple. Capsule (at first rather fleshy) 3-angled, loculicidally 3-valved, with several black spherical seeds in each cell. — Showy perennials, with fleshy-fibrous roots; the long and linear keeled leaves 2-ranked at the base of the tall scapes, which bear at the summit several bracted and large yellow flowers; these collapse and decay after expanding for a single day (whence the name, from ἡμέρα, *a day*, and κάλλος, *beauty*.)

**H. fúlva**, L. (Common Day-Lily.) Inner divisions (petals) of the tawny orange perianth wavy and obtuse. — Roadsides, escaped from gardens. (Adv. from Eu.)

### 9. YÚCCA, L. Bear-Grass. Spanish Bayonet.

Perianth of 6 petal-like (white or greenish) oval or oblong and acute flat sepals, withering-persistent, the 3 inner broader, longer than the 6 stamens. Stigmas 3, sessile. Capsule oblong, somewhat 6-sided, 3-celled, or imperfectly 6-celled by a partition from the back, fleshy, at length loculicidally 3-valved from the apex. Seeds very many in each cell, flattened. — Stems woody, either very short or rising into thick and columnar palm-like trunks, bearing persistent rigid linear or sword-shaped leaves, and an often ample compound panicle or branched raceme of showy flowers. (The native Haytian name for the root of the Cassava-plant.)

1. **Y. angustifòlia**, Pursh. Caudex none or very short; leaves straight *very stiff and pungent*, $\frac{1}{2}$ – 2° long by 1 – 6″ wide, filiferous on the margin; *raceme mostly simple*, *nearly sessile* (1 – 4° long); flowers $1\frac{1}{2}$ – $2\frac{1}{2}$′ wide; stigmas green, shorter than the ovary; capsule 6-sided (3′ long); *seeds* 5 – 6″ *broad* — Dak. to Iowa, Kan., and N. Mex. May, June.

2. **Y. filamentòsa**, L. (Adam's Needle.) Caudex 1° high or less, from a running rootstock; leaves numerous, coriaceous, more or less tapering to a short point, rough on the back, $1\frac{1}{2}$ – 2° long by 1 – 3′ wide, filiferous on the margin; *panicle pyramidal*, *densely flowered*, *on a stout bracteate scape*, 4 – 9° *high*; flowers large; stigmas pale, elongated; capsule $1\frac{1}{2}$′ long; *seeds* 3″ *broad*. — Near the coast, Md. to Fla. and La. July. Very variable.

### 10. CONVALLÀRIA, L. Lily of the Valley.

Perianth bell-shaped (white), 6-lobed, deciduous; the lobes recurved. Stamens 6, included, inserted on the base of the perianth; anthers introrse. Ovary 3-celled, tapering into a stout style; stigma triangular. Ovules 4 – 6 in each cell. Berry few-seeded (red). — A low perennial herb, glabrous, stemless, with slender running rootstocks, sending up from a scaly-sheathing bud 2 oblong leaves, with their long sheathing petioles enrolled one within the other so as to appear like a stalk, and an angled scape bearing a one-sided raceme of pretty and sweet-scented nodding flowers. (Altered from *Lilium convallium*, the popular name.)

1. **C. majàlis**, L. — High mountains of Va. to S. C. Apparently identical with the European Lily of the Valley of the gardens.

### 11. POLYGONÀTUM, Tourn. Solomon's Seal.

Perianth cylindrical-oblong, 6-lobed at the summit; the 6 stamens inserted on or above the middle of the tube, included; anthers introrse. Ovary 3-celled.

with 2 – 6 ovules in each cell; style slender, deciduous by a joint; stigma obtuse or capitate, obscurely 3-lobed. Berry globular, black or blue; the cells 1 – 2-seeded. — Perennial herbs, with simple erect or curving stems, from creeping thick and knotted rootstocks, naked below, above bearing nearly sessile or half-clasping nerved leaves, and axillary nodding greenish flowers; pedicels jointed near the flower. (The ancient name, composed of πολύς, *many*, and γόνυ, *knee*, alluding to the numerous joints of the rootstock and stem.) — Ours are alternate-leaved species, the stem terete or scarcely angled when fresh.

1. **P. biflòrum,** Ell. (SMALLER SOLOMON'S SEAL.) Glabrous, except the ovate-oblong or lance-oblong *nearly sessile leaves*, which are commonly *minutely pubescent as well as pale or glaucous underneath;* stem slender (1 – 3° high); *peduncles* 1 – 3- *but mostly* 2-*flowered;* perianth 4 – 6″ long; *filaments papillose-roughened,* inserted toward the summit of the perianth. — Wooded hillsides, N. Brunswick to Fla., west to Minn., E. Kan., and Tex.

2. **P. gigantèum,** Dietrich. (GREAT S.) *Glabrous throughout;* stem stout and mostly tall (2 – 7° high), terete; *leaves ovate, partly clasping* (3 – 8′ long), or the upper oblong and nearly sessile, many-nerved; *peduncles several-* (2 – 8-) *flowered,* jointed below the flower; flowers 5 – 9″ long; *filaments smooth and naked,* or nearly so, inserted on the middle of the tube. — Meadows and river-banks, N. Eng. to Va., west to the Rocky Mts. June.

## 12. ASPÁRAGUS, Tourn. ASPARAGUS.

Perianth 6-parted, spreading above; the 6 stamens on its base; anthers introrse. Style short; stigma 3-lobed. Berry spherical, 3-celled; the cells 2-seeded. — Perennials, with much-branched stems from thick and matted rootstocks, and small greenish-yellow axillary flowers on jointed pedicels. The narrow, commonly thread-like, so-called leaves are really branchlets, acting as leaves, clustered in the axils of little scales which are the true leaves. (The ancient Greek name.)

**A.** OFFICINÀLIS, L. (GARDEN ASPARAGUS.) Herbaceous, tall, bushy-branched; leaves thread-like. — A frequent escape from gardens. June. (Adv. from Eu.)

## 13. SMILACÌNA, Desf. FALSE SOLOMON'S SEAL.

Perianth 6-parted, spreading, withering-persistent (white). Stamens 6, inserted at the base of the divisions; filaments slender, anthers short, introrse. Ovary 3-celled, with 2 ovules in each cell; style short and thick stigma obscurely 3-lobed. Berry globular, 1 – 2-seeded. — Perennial herbs, with simple stems from creeping or thickish rootstocks, alternate nerved mostly sessile leaves, and white, sometimes fragrant flowers in a terminal and simple or compound raceme. (Name a diminutive of *Smilax*, to which, however, these plants bear little resemblance.)

* *Flowers on very short pedicels in a terminal racemose panicle; stamens exceeding the small* (1″ *long*) *segments; ovules collateral; rootstock stout, fleshy.*

1. **S. racemòsa,** Desf. (FALSE SPIKENARD.) Minutely downy (1 – 3° high); leaves numerous, oblong or oval-lanceolate, taper-pointed, ciliate, abruptly somewhat petioled; berries pale red, speckled with purple, aromatic. — Moist copses, N. Brunswick to S. C., west to Minn., E. Kan. and Ark.

* * *Flowers larger* (2–3″ *long*), *on solitary pedicels in a simple few-flowered raceme; stamens included; ovules not collateral; rootstock rather slender.*

2. **S. stellàta,** Desf. Plant (1° high or less) nearly glabrous, or the 7–12 *oblong-lanceolate leaves* minutely downy beneath when young, slightly clasping; raceme sessile or nearly so; *berries blackish.* — Moist banks, Lab. to N. J., west to E. Kan., Minn., and westward. (Eu.)

3. **S. trifòlia,** Desf. Glabrous, *dwarf* (2–6′ high); *leaves* 3 (sometimes 2 or 4), oblong, tapering to a *sheathing base;* raceme peduncled; *berries red.* — Cold bogs, Lab. to N. Eng., west to Mich. and Min. (Sib.)

## 14. MAIÁNTHEMUM, Wigg.

Perianth 4-parted, with as many stamens. Ovary 2-celled; stigma 2-lobed. Otherwise as in Smilacina. — Flowers solitary or fascicled, in a simple raceme upon a low 2–3-leaved stem. Leaves ovate- to lanceolate-cordate. (Name from *Maius,* May, and *ἄνθεμον, a flower.*)

1. **M. Canadénse,** Desf. Pubescent or glabrous (3–5′ high); leaves lanceolate to ovate, cordate at base with a very narrow sinus, sessile or very shortly petioled; perianth-segments 1″ long. (Smilacina bifolia, var. Canadensis, *Gray.*) — Moist woods, Lab. to N. C., west to Minn. and Iowa. May.

## 15. STRÉPTOPUS, Michx. TWISTED-STALK.

Perianth recurved-spreading from a bell-shaped base, deciduous; the 6 distinct sepals lanceolate, acute, the 3 inner keeled. Anthers arrow-shaped, extrorse, fixed near the base to the short flattened filaments, tapering above to a slender entire or 2-cleft point. Ovary with many ovules in each cell; style and sometimes the stigmas one. Berry red, roundish-ovoid, many-seeded. — Herbs, with rather stout stems from a creeping rootstock, forking and divergent branches, ovate and taper-pointed rounded-clasping membranaceous leaves, and small (extra-) axillary flowers, either solitary or in pairs, on slender thread-like peduncles, which are abruptly bent or contorted near the middle (whence the name, from *στρεπτός, twisted,* and *πούς, foot* or *stalk*).

1. **S. amplexifòlius,** DC. Stem 2–3° high, glabrous; *leaves very smooth, glaucous underneath,* strongly clasping; *flower greenish-white* (4–6″ long) on a long abruptly bent peduncle; anthers tapering to a slender entire point; *stigma entire, truncate.* — Cold moist woods, N. Eng. to N. Minn., south to Ohio, Penn., and in the mountains to N. C. June. (Eu.)

2. **S. ròseus,** Michx. *Lower leaves green both sides, finely ciliate,* and the branches sparingly beset with short bristly hairs; *flower rose-purple* (3–4″ long), more than half the length of the slightly bent peduncle; anthers 2-horned; *stigma 3-cleft.* — Cold damp woods, N. Eng. to N. Minn., and south in the mountains to Ga. May.

## 16. DÍSPORUM, Salisb.

Perianth narrowly bell-shaped, the 6 sepals lanceolate or linear, deciduous. Filaments thread-like, much longer than the linear-oblong blunt anthers, which are fixed by a point above the base and extrorse. Ovary with 2 ovules (in our species) suspended from the summit of each cell; style one; stigmas short, recurved-spreading, or sometimes united into one! Berry ovoid or oblong, pointed, 3-6-seeded, red. — Downy low herbs, with creeping rootstocks, erect stems sparingly branched above, with closely sessile ovate thin and transversely veined leaves, and greenish-yellow drooping flowers, on slender terminal peduncles, solitary or few in an umbel. (Name from δίς, *double*, and σπορά, *seed*, in allusion to the 2 ovules in each cell.)

1. **D. lanuginòsum,** Benth. & Hook. Leaves ovate-oblong, taper-pointed, rounded or slightly heart-shaped at base, closely sessile, downy beneath; flowers solitary or in pairs; sepals linear-lanceolate, taper-pointed (½′ long), soon spreading, twice the length of the stamens, greenish; style smooth; stigmas 3. (Prosartes lanuginosa, *Don.*) — Rich woods, western N. Y. to Va. and Ga., west to Ky. and Tenn. May.

## 17. CLINTÒNIA, Raf.

Perianth of 6 separate sepals, bell-shaped, lily-like, deciduous; the 6 stamens inserted at their base. Filaments long and thread-like; anthers linear or oblong, extrorsely fixed by a point above the base, the cells opening down the margins. Ovary ovoid-oblong, 2-3-celled; style long; stigmas 2 or 3, or in ours united into one. Berry few-many-seeded. — Short-stemmed perennials, with slender creeping rootstocks, bearing a naked peduncle sheathed at the base by the stalks of 2-4 large oblong or oval ciliate leaves; flowers rather large, umbelled, rarely single. (Dedicated to *De Witt Clinton.*)

1. **C. boreàlis,** Raf. Scape and leaves 5-8′ long; *umbel 3-6-flowered;* perianth greenish-yellow, somewhat downy outside (3-4″ long); berry ovoid, blue; *ovules 20 or more.* — Cold moist woods, Lab. to N. C., west to Minn.

2. **C. umbellàta,** Torr. Flowers half the size of the last, white, speckled with green or purplish dots; *umbel many-flowered;* berry globular, black; *ovules 2 in each cell.* — Rich woods, in the Alleghanies from N. Y. to Ga.

## 18. UVULÀRIA, L. BELLWORT.

Perianth narrowly bell-shaped, lily-like, deciduous; the 6 distinct sepals spatulate-lanceolate, acuminate, obtusely gibbous at base, with a deep honey-bearing groove within bordered on each side by a callus-like ridge. Stamens much shorter, barely adherent to their base; anthers linear, much longer than the filaments, adnate and extrorse, but the long narrow cells opening laterally. Style deeply 3-cleft; the divisions stigmatic along the inner side. Capsule truncate, coriaceous, 3-lobed, loculicidal at the summit. Seeds few in each cell, obovoid, with a thin white aril. — Stems rather low, terete, from a short rootstock with fleshy roots, naked or scaly at base, forking above, bearing oblong perfoliate flat and membranaceous leaves with smooth margins, and yellowish drooping flowers, in spring, solitary on terminal peduncles. (Name "from the flowers hanging like the *uvula*, or palate.")

1. **U. perfoliàta,** L. *Glaucous throughout,* ½-1½° high, with 1-3 leaves below the fork; *leaves glabrous,* oblong- to ovate-lanceolate, acute; *perianth-segments granular-pubescent within* (8-16″ long); *stamens shorter than the styles; tip of the connective acuminate;* cells of the capsule with 2 dorsal ridges and 2-beaked at the apex. — Rich woods, N. Eng. to Dak., and southward.

2. **U. grandiflòra,** Smith. Yellowish-green, *not glaucous;* stem naked or with a single leaf below the fork; *leaves whitish-pubescent beneath,* usually somewhat acuminate; *perianth-segments smooth within* or nearly so (12 – 18″ long); *stamens exceeding the styles, obtusely tipped;* capsule obtusely lobed. (U. flava, *Smith.*) — Rich woods, Canada to Ga., west to Minn. and Mo.

## 19. OAKÈSIA, Watson.

Flowers resembling those of Uvularia, but the segments obtuse or acutish, carinately gibbous and without ridges within. Capsule membranous, elliptical, acutish at each end or shortly stipitate, triquetrous and acutely winged, very tardily dehiscent. Seeds globose, with a very tumid spongy rhaphe. — Stem acutely angled, from a slender creeping rootstock, with sessile clasping leaves scabrous on the margin, and 1 or 2 flowers terminal on slender peduncles but soon appearing opposite to the leaves by the growth of the branches. (Dedicated to *William Oakes.*)

1. **O. sessilifòlia,** Watson. Leaves lance-oblong, acute at each end, pale, glaucous beneath, sessile or partly clasping; sepals 7 – 12″ long; anthers obtuse; capsule short-stipitate, 6 – 10″ long. (Uvularia sessilifolia, *L.*) — Low woods, N. Brunswick to Fla., west to Minn., Neb. and Ark.

2. **O. pubérula,** Watson. Slightly puberulent; leaves bright green both sides and shining, oval, mostly rounded at base, with rougher edges; styles separate to near the base, not exceeding the acute anthers; capsule not stipitate, 10 – 12″ long. (Uvularia puberula, *Michx.*) — Mountains, Va. to S. C.

## 20. ERYTHRÒNIUM, L. DOG'S-TOOTH VIOLET.

Perianth lily-like, of 6 distinct lanceolate sepals, recurved or spreading above, deciduous, the 3 inner usually with a callous tooth on each side of the erect base, and a groove in the middle. Filaments 6, awl-shaped; anthers oblong-linear, continuing erect. Style elongated. Capsule obovate, contracted at base, 3-valved, loculicidal. Seeds rather numerous, ovoid, with a loose membranaceous tip. — Nearly stemless herbs, with two smooth and shining flat leaves tapering into petioles and sheathing the base of the commonly one-flowered scape, rising from a deep solid-scaly bulb. Flowers rather large, nodding, in spring. (The Greek name for the purple-flowered European species, from *ἐρυθρός, red.*)

1. **E. Americànum,** Ker. (YELLOW ADDER'S-TONGUE.) Scape 6 – 9′ high; leaves elliptical-lanceolate, pale green, mottled with purplish and whitish and commonly minutely dotted; *perianth light yellow,* often spotted near the base (10 – 20″ long); style club-shaped; *stigmas united.* — Rich ground, N. Brunswick to Fla., west to Minn. and Ark.

2. **E. álbidum,** Nutt. (WHITE DOG'S-TOOTH VIOLET.) Leaves elliptical-lanceolate, less or not at all spotted; *perianth pinkish-white;* inner divisions toothless; style more slender except at the apex, bearing 3 short *spreading stigmas.* — Rich ground, N. Y. to N. J., west to Minn. and Kan.

3. **E. propúllans,** Gray. *Offshoot arising from the stem, near the middle;* leaves smaller and more acuminate; *flowers bright rose-color,* yellowish at base (6″ long); *style slender; stigmas united.* — In rich soil, Minn. and Ont.

## 21. LÍLIUM, L. Lily.

Perianth funnel-form or bell-shaped, colored, of 6 distinct sepals, spreading or recurved above, with a honey-bearing furrow at the base, deciduous; the 6 stamens somewhat adhering to their bases. Anthers linear, extrorsely attached near the middle to the tapering apex of the long filament, which is at first included, at length versatile; the cells dehiscent by a lateral or slightly introrse line. Style elongated, somewhat club-shaped; stigma 3-lobed. Capsule oblong, containing numerous flat and horizontal (depressed) soft-coated seeds densely packed in 2 rows in each cell. Bulbs scaly, producing simple stems, with numerous alternate-scattered or whorled narrow sessile leaves, and from one to several large and showy flowers; in summer. (The classical Latin name, from the Greek λείριον.)

* *Flowers erect, the sepals narrowed below into claws; bulbs not rhizomatous.*

1. **L. Philadélphicum,** L. (Wild Orange-red Lily. Wood Lily.) Stem 2–3° high; *leaves linear-lanceolate, whorled or scattered;* flowers (2–4′ long) 1–3, open-bell-shaped, *reddish-orange* spotted with purplish inside; the lanceolate sepals not recurved at the summit; bulb of thick fleshy jointed scales. — Dry or sandy ground, N. Eng. to N. C., west to Minn. and Mo.

2. **L. Catesbæi,** Walt. (Southern Red Lily.) *Leaves linear-lanceolate, scattered;* flower solitary, open-bell-shaped, the long-clawed sepals wavy on the margin and recurved at the summit, *scarlet,* spotted with dark purple and yellow inside; bulb-scales thin, narrow and leaf-bearing. — Pine-barrens, N. C. to Fla., west to Ky. and Mo.

* * *Flowers nodding, the sepals sessile; bulbs rhizomatous.*

3. **L. supérbum,** L. (Turk's-cap Lily.) Stem 3–7° high; *lower leaves whorled,* lanceolate, pointed, 3-nerved, smooth; flowers (3′ long) often many (3–20 or 40) in a pyramidal raceme; *sepals strongly revolute,* bright orange, with numerous dark purple spots inside. — Rich low grounds, N. Brunswick to Ga., west to Minn. and Mo.

4. **L. Canadénse,** L. (Wild Yellow Lily.) Stem 2–7° high; *leaves remotely whorled,* lanceolate, strongly 3-nerved, the margins and nerves rough; flowers few (2–3′ long), long-peduncled, oblong-bell-shaped, the *sepals recurved-spreading above,* yellow or orange, usually spotted with brown. — Moist meadows and bogs, N. Brunswick to Ga., west to Minn. and Mo.

5. **L. Gràyi,** Watson. Stems 2–3° high; leaves in whorls of 4–8, lanceolate, acute or slightly acuminate, smooth; *flowers* 1 or 2, *nearly horizontal, the sepals* (1½–2½′ long) but *little spreading above the rather broad base,* rather abruptly acute, deep reddish orange, thickly spotted within. — Peaks of Otter, Va., and southward in the mountains to N. C.

**L. tigrìnum,** Ker. (Tiger Lily.) Tall, pubescent above; leaves scattered, narrowly lanceolate, dark green, 5–7-nerved, the upper axils bulbiferous; flowers large, resembling those of L. superbum. — An escape from gardens. (Adv. from E. Asia.)

## 22. MEDÈOLA, Gronov. Indian Cucumber-root.

Perianth recurved, the 3 sepals and 3 petals oblong and alike (pale greenish-yellow), deciduous. Stamens 6; anthers shorter than the slender filaments, oblong, extrorsely attached above the base, but the line of dehiscence of the closely contiguous parallel cells lateral or slightly introrse. Stigmas, or styles, stigmatic down the upper side, recurved-diverging from the globose ovary, long and thread-form, deciduous. Berry globose (dark purple), 3-celled, few-seeded. — A perennial herb, with a simple slender stem (1 – 3° high, clothed with flocculent and deciduous wool), rising from a horizontal and tuberous white rootstock (which has the taste of cucumber), bearing near the middle a whorl of 5 – 9 obovate-lanceolate and pointed, sessile, lightly parallel-ribbed and netted-veiny, thin leaves; also another of 3 (rarely 4 or 5) much smaller ovate ones at the top, subtending a sessile umbel of small recurved flowers. (Named after the sorceress *Medea*, for its supposed great medicinal virtues.)

1. **M. Virginiàna,** L. — Rich damp woods, N. Eng. to Minn., Ind., and southward. June.

### 23. TRÍLLIUM, L. WAKE ROBIN. BIRTHROOT.

Sepals 3, lanceolate, spreading, herbaceous, persistent. Petals 3, larger, withering in age. Stamens 6; anthers linear, on short filaments, adnate, usually introrse; the cells opening down the margins. Stigmas sessile, awl-shaped or slender, spreading or recurved above, persistent, stigmatic down the inner side. Ovary 3 – 6-angled. Berry ovate, usually 6-angled or -winged, 3-celled (purple or red). Seeds ovate, horizontal, several in each cell. — Low perennial herbs, with a stout and simple stem rising from a short and præmorse tuber-like rootstock, naked, bearing at the summit a whorl of 3 ample, commonly broadly ovate, more or less ribbed but netted-veined leaves, and a terminal large flower; in spring. (Name from *triplum*, triple; all the parts being in threes.) — Monstrosities are not rare with the calyx and sometimes petals changed to leaves, or the parts of the flower increased in number.

* *Ovary and fruit 6-angled and more or less winged.*

+ *Flower sessile; the very broad connective produced beyond the anther-cells.*

1. **T. séssile,** L. *Leaves sessile, ovate* or rhomboidal, acute, often blotched or spotted; sepals spreading; *sessile petals erect-spreading*, narrowly lanceolate or oblanceolate, dark and dull purple, varying to greenish; fruit globose, 6″ long. — Moist woods, Penn. to Fla., west to Minn. and Ark.

2. **T. recurvàtum,** Beck. *Leaves contracted at the base into a petiole, ovate, oblong, or obovate*; *sepals reflexed*; *petals* pointed, the base *narrowed into a claw*, oblong-lanceolate to -ovate, dark purple; fruit ovate, strongly winged above, 9″ long. — Rich woods, Ohio and Ind. to Minn. and Ark.

+ + *Flower pedicelled; connective narrow, not produced; leaves subsessile.*

++ *Pedicel longer than the flower; filament shorter than the anther.*

3. **T. eréctum,** L. Leaves very broadly rhombic ($2\frac{1}{2}$ – 6′ wide), shortly acuminate; pedicel (1 – 3′ long) usually more or less inclined or declinate; *petals ovate to lanceolate* (9 – 18″ long), brown-purple or often white or greenish or pinkish; stamens equalling or exceeding the *stout distinct spreading or recurved stigmas*; fruit ovate, 1′ long, reddish. — Rich woods, N. Scotia to N. C., west to Minn. and Mo. Flowers ill-scented.

4. **T. grandiflòrum,** Salisb. Leaves less broadly rhombic-ovate ($1\frac{1}{2}$ – 4′ wide); pedicel erect or ascending; *petals oblanceolate*, often broadly so ($1\frac{1}{2}$ – $2\frac{1}{2}$′ long), white turning rose-color or marked with green; stamens with stout

filaments (persistently green about the fruit) and anthers, *exceeding the very slender erect or suberect and somewhat coherent stigmas;* fruit globose, ½–1′ long. — Rich woods, Vt. to N. C., west to Minn. and Mo.

++ ++ *Pedicel short, recurved or strongly declinate; filaments slender, about equalling the anther.*

5. **T. cérnuum,** L. Leaves very broadly rhombic-ovate (2–4′ broad); petals white or pink, ovate- to oblong-lanceolate (6–12″ long), wavy, recurved-spreading; stamens with short anthers, shorter than the stout recurved distinct stigmas; fruit ovate. — Moist woods, N. Eng. to Minn., south to Ga. and Mo.

* * *Ovary and fruit 3-lobed or angled, not winged; filaments slender, about equalling the anthers; pedicel erect or inclined; leaves petiolate.*

6. **T. nivàle,** Riddell. (DWARF WHITE T.) Small (2–4′ high); *leaves oval or ovate, obtuse* (1–2′ long); *petals oblong, obtuse* (6–15″ long), *white,* scarcely wavy, spreading from an erect base, equalling the peduncle; styles long and slender; fruit depressed globose, with 3 rounded lobes, 3–4″ long. — Rich woods, W. Penn. and Ky. to Minn. and Iowa.

7. **T. erythrocárpum,** Michx. (PAINTED T.) *Leaves ovate, taper-pointed; petals ovate or oval-lanceolate, pointed, wavy,* widely spreading, *white painted with purple stripes at the base,* shorter than the peduncle; fruit broad-ovate, obtuse, 7–9″ long. — Cold damp woods and bogs, N. Brunswick to Ga., west to Wisc. and Mo.

## 24. HELÒNIAS, L.

Flowers perfect. Perianth of 6 spatulate-oblong purple sepals, persistent, several-nerved, glandless, turning green, shorter than the thread-like filaments. Anthers 2-celled, roundish-oval, blue, extrorse. Styles revolute, stigmatic down the inner side, deciduous. Capsule obcordately 3-lobed, loculicidally 3-valved; the valves divergently 2-lobed. Seeds many in each cell, linear, with a tapering appendage at both ends. — A smooth perennial, with many oblong-spatulate or oblanceolate evergreen flat leaves, from a tuberous rootstock, producing in early spring a stout hollow sparsely bracteate scape (1–2° high), sheathed with broad bracts at the base, and terminated by a simple and short dense raceme. Bracts obsolete; pedicels shorter than the flowers. (Name probably from ἕλος, *a swamp,* the place of growth.)

1. **H. bullàta,** L. — Wet places, Penn. and N. J. to Va.; rare and local.

## 25. CHAMÆLÍRIUM, Willd. DEVIL'S-BIT.

Flowers diœcious. Perianth of 6 spatulate-linear (white) spreading 1-nerved sepals, withering-persistent. Filaments and (white) anthers, as in Helonias; fertile flowers with rudimentary stamens. Styles linear-club-shaped, stigmatic along the inner side. Capsule ovoid-oblong, not lobed, of a thin texture, loculicidally 3-valved from the apex, many-seeded. Seeds linear-oblong, winged at each end. — Smooth herb, with a wand-like stem from a (bitter) thick and abrupt tuberous rootstock, terminated by a long wand-like spiked raceme (4–12′ long) of small bractless flowers; fertile plant more leafy than the staminate. Leaves flat, lanceolate, the lowest spatulate, tapering into a petiole. (Name formed of *χαμαί, on the ground,* and *λείριον, lily,* the genus having been founded on a dwarf undeveloped specimen.)

1. **C. Caroliniànum,** Willd. (Blazing-Star.) Stem 1–4° high. (C. luteum, *Gray.*) — Low grounds, N. Eng. to Ga., west to Neb. and Ark. June.

### 26. XEROPHÝLLUM, Michx.

Flowers perfect. Perianth widely spreading; sepals petal-like (white), oval, distinct, without glands or claws, 5–7-nerved, at length withering, about the length of the awl-shaped filaments. Anthers 2-celled, short, extrorse. Styles thread-like, stigmatic down the inner side, persistent. Capsule globular, 3-lobed, obtuse (small), loculicidal; the valves bearing the partitions. Seeds 2 in each cell, collateral, 3-angled, not margined. — Herb with the stem simple, 1–4° high, from a thick tuberous rootstock, bearing a simple dense bracteate raceme of showy flowers, and thickly beset with needle-shaped leaves, the upper reduced to bristle-like bracts; those from the root very many in a dense tuft, reclined, a foot long or more, 1″ wide below, rough on the margin, remarkably dry and rigid. (Name from *ξηρός, arid,* and *φύλλον, leaf.*)

1. **X. setifòlium,** Michx. Stem 1–4° high. (X. asphodeloides, *Nutt.*) — Pine-barrens, N. J. to Ga. June.

### 27. TOFIÈLDIA, Hudson. False Asphodel.

Flowers perfect, usually with a little 3-bracted involucre underneath. Perianth more or less spreading, persistent; the sepals (white or greenish) concave, oblong or obovate, without claws, 3-nerved. Filaments awl-shaped; anthers short, innate or somewhat introrse, 2-celled. Styles awl-shaped; stigmas terminal. Capsule 3-angular, 3-partible or septicidal; cells many-seeded. Seeds oblong, horizontal. — Slender perennials, mostly tufted, with short or creeping rhizomes, and simple stems leafy only at the base, bearing small flowers in a close raceme or spike. Leaves 2-ranked, equitant, linear, grass-like. (Named for *Mr. Tofield,* an English botanist of the last century.)

* *Glabrous; pedicels solitary, in a short raceme or head; seeds not appendaged.*

1. **T. palústris,** Hudson. Scape leafless or nearly so (2–6′ high), slender, bearing a globular or oblong head or short raceme of whitish flowers; leaves tufted, ½–1½′ long. — L. Superior, and northward. (Eu.)

* * *Stem and inflorescence pubescent; pedicels fascicled in threes; seeds caudate.*

2. **T. glutinòsa,** Willd. Stem (6–16′ high) and pedicels very *glutinous with dark glands;* leaves broadly linear, short; perianth not becoming rigid; capsule thin; seeds with a contorted tail at each end. — Moist grounds, Maine to Minn., and northward; also south in the Alleghanies. June.

3. **T. pùbens,** Ait. Stem (1–3° high) and pedicels *roughened with minute glands;* leaves longer and narrower; perianth rigid about the firm capsule; seeds with a short white appendage at each end. — Pine-barrens, N. J. to Fla. and Ala. July.

### 28. NARTHÈCIUM, Moehring. Bog-Asphodel.

Sepals 6, linear-lanceolate, yellowish, persistent. Filaments 6, woolly; anthers linear, introrse. Capsule cylindrical-oblong, attenuate upward and bearing the slightly lobed sessile stigma, loculicidal, many-seeded. Seeds ascending, appendaged at each end with a long bristle-form tail. — Rootstock creeping, bearing linear equitant leaves, and a simple stem or scape, terminated by a simple dense bracteate raceme; pedicels bearing a linear bractlet. (Name an anagram of *Anthericum*, from ἀνθέρικος, supposed to have been the Asphodel.)

1. **N. Americànum,** Ker. Stem 1° high or more; leaves 1″ wide, 7 – 9-nerved; raceme dense (1 – 2′ long); perianth-segments narrowly linear (2 – 2½″ long), scarcely exceeding the stamens. (N. ossifragum, var. Americanum, *Gray.*) — Sandy bogs, pine-barrens of N. J. June, July.

## 29. MELÁNTHIUM, Linn.

Flowers monœciously polygamous. Perianth of 6 separate and free widely spreading somewhat heart-shaped or oblong and halberd shaped or oblanceolate sepals, raised on slender claws, cream-colored or greenish, the base marked with 2 approximate or confluent glands, or glandless, turning greenish brown and persistent. Filaments shorter than the sepals, adhering to their claws often to near the summit, persistent. Anthers heart-shaped or kidney-shaped, confluently 1-celled, shield-shaped after opening, extrorse. Styles 3, awl-shaped, diverging, tipped with simple stigmas. Capsule ovoid-conical, 3-lobed, of 3 inflated membranaceous carpels united in the axis, separating when ripe, and splitting down the inner edge, several-seeded. Seeds flat, broadly winged. — Stems tall and leafy, from a thick rootstock, roughish-downy above, as well as the open and ample pyramidal panicle (composed chiefly of simple racemes), the terminal part mostly fertile. Leaves linear to oblanceolate or oval, not plaited. (Name composed of μέλας, *black*, and ἄνθος, *flower*, from the darker color which the persistent perianth assumes after blossoming.)

* *Sepals with a conspicuous double gland at the summit of the claw.*

1. **M. Virgínicum,** L. (Bunch-flower.) Stem 3 – 5° high, leafy, rather slender; leaves linear (4 – 10″ wide); sepals flat, ovate to oblong or slightly hastate (2½ – 4″ long); capsule 6″ long; seeds 10 in each cell, 2 – 3″ long. — Wet meadows, N. Eng. to N. C., west to Minn. and Tex.

2. **M. latifòlium,** Desrouss. Leaves more oblanceolate, often 2′ broad; sepals undulate (2 – 3″ long), the very narrow claw nearly equalling the orbicular or ovate blade; capsule 6 – 8″ long; styles more slender; seeds 4 – 8 in each cell, 3 – 4″ long. (M. racemosum, *Michx.*) — W. Conn. to S. C.

* * *Sepals oblanceolate, without glands.*

3. **M. parviflòrum,** Watson. Stem rather slender (2 – 5° high), sparingly leafy, naked above; leaves oval to oblanceolate (2 – 4′ wide), on long petioles; sepals 2 – 3″ long, oblanceolate or spatulate, those of the sterile flowers on claws; stamens very short; capsule 6″ long; seeds 4 – 6 in each cell, 4″ long. (Veratrum parviflorum, *Michx.*) — In the Alleghanies, Va. to S. C.

## 30. VERÀTRUM, Tourn. False Hellebore.

Flowers monœciously polygamous. Perianth of 6 spreading and separate obovate-oblong (greenish or brownish) sepals, more or less contracted at the base (but not clawed), nearly free from the ovary, not gland-bearing. Filaments free from the sepals and shorter than they, recurving. Anthers, pistils, fruit, etc., nearly as in Melanthium. — Somewhat pubescent perennials, with simple stems from a thickened base producing coarse fibrous roots (very poisonous), 3-ranked, plaited and strongly veined leaves, and racemed-panicled dull or dingy flowers; in summer. (Name from *vere*, truly, and *ater*, black.)

1. **V. víride**, Ait. (American White Hellebore. Indian Poke.) *Stem stout, very leafy* to the top (2 – 7° high); *leaves broadly oval*, pointed, *sheath-clasping; panicle pyramidal*, the *dense spike-like racemes* spreading; *perianth yellowish-green*, moderately spreading, *the segments ciliate-serrulate; ovary glabrous;* capsule many-seeded. — Swamps and low grounds, common.

2. **V. Woódii**, Robbins. *Stem slender, sparingly leafy* (2 – 5° high); *leaves oblanceolate*, only the lowest sheathing; *panicle very narrow; perianth greenish-purple, with entire segments; ovary tomentose*, soon glabrate; capsule few-seeded. — Woods and hilly barrens, S. Ind. to Mo.

## 31. STENÁNTHIUM, Gray.

Flowers polygamous. Perianth spreading; the sepals narrowly lanceolate, tapering to a point from the broader base, where they are united and coherent with the base of the ovary, not gland-bearing, persistent, much longer than the short stamens. Anthers, capsules, etc., nearly as in Veratrum. Seeds nearly wingless. — Smooth, with a wand-like leafy stem from a bulbous base, long and grass-like conduplicate-keeled leaves, and numerous small flowers in compound racemes, forming a long terminal panicle; in summer. (Name composed of *στενός, narrow*, and *ἄνθος, flower*, from the slender sepals and panicles.)

1. **S. angustifòlium**, Gray. Stem leafy (3 – 4° high), *very slender; leaves 2 – 3″ broad;* panicle elongated, nearly simple, very open, with slender flexuous branches; flowers nearly sessile or the fertile on short pedicels; sepals linear-lanceolate (white), 2 – 3″ long; *capsule strongly reflexed*, narrowly oblong-ovate, with spreading beaks. — In the Alleghanies from Va. to S. C.

2. **S. robústum**, Watson. Resembling the last; *stem stout*, leafy, erect (3 – 5° high); *leaves 4 – 10″ broad;* panicle or raceme often 2° long, frequently compound with numerous slender branches; sepals (white or green) 3 – 4″ long; *capsule erect*, ovate, with recurved beaks. — Penn. to S. C., Ohio and Tenn.

## 32. ZYGADÈNUS, Michx.

Flowers perfect or polygamous. Perianth withering-persistent, spreading; the petal-like oblong or ovate sepals 1 – 2-glandular near the more or less narrowed but not unguiculate base, which is either free, or united and coherent with the base of the ovary. Stamens free from the sepals and about their length. Anthers, styles, and capsule nearly as in Melanthium. Seeds angled, rarely at all margined. — Very smooth and somewhat glaucous perennials, with simple stems from creeping rootstocks or coated bulbs, linear leaves, and rather large panicled greenish-white flowers; in summer. (Name composed of *ζυγός, a yoke*, and *ἀδήν, a gland*, the glands being sometimes in pairs.)

* *Glands on the perianth conspicuous.*

+ *Rootstock creeping; glands 2, orbicular, above the broad claw.*

1. **Z. glabérrimus**, Michx. Stems 1 – 3° high; leaves grass-like, channelled, conspicuously nerved, elongated, tapering to a point; panicle pyramidal,

many-flowered; flowers perfect; sepals nearly free (⅓′ long), ovate, becoming lance-ovate, with a short claw. — Grassy low grounds, Va. to Fla. and Ala.

+- +- *Root bulbous; glands covering the base of the sepals.*

2. **Z. élegans,** Pursh. Stem 1 – 3° high; leaves flat, carinate; raceme simple or sparingly branched and few-flowered; bracts ovate-lanceolate; base of the perianth coherent with the base of the ovary, the thin ovate or obovate sepals marked with a large obcordate gland, the inner abruptly contracted to a broad claw. (Z. glaucus, *Nutt.*) — N. Eng. to N. Ill., Minn., and westward.

3. **Z. Nuttàllii,** Gray. Like the last; raceme rather densely flowered, with narrow bracts; perianth free; sepals with an ill-defined gland at base, not at all clawed; seeds larger (3″ long). — Kan. to Tex. and Col.

* * *Glands of the perianth obscure; perianth small, rotate; bulb somewhat fibrous.*

4. **Z. leimanthoìdes,** Gray. Stem 1 – 4° high, slender; leaves narrowly linear; flowers small (4″ in diameter) and numerous, in a few crowded panicled racemes; only a yellowish spot on the contracted base of the divisions of the free perianth. — Low grounds, pine-barrens of N. J., to Ga.

### 33. AMIÁNTHIUM, Gray. FLY-POISON.

Flowers perfect. Perianth widely spreading; the distinct and free petal-like (white) sepals oval or obovate, without claws or glands, persistent. Filaments capillary, equalling or exceeding the perianth. Anthers, capsules, etc., nearly as in Melanthium. Styles thread-like. Seeds wingless, oblong or linear, with a loose coat, 1 – 4 in each cell. — Glabrous, with simple stems from a bulbous base or coated bulb, scape-like, few-leaved, terminated by a simple dense raceme of handsome flowers, turning greenish with age. Leaves linear, keeled, grass-like. (From *ἀμίαντος, unspotted*, and *ἄνθος, flower;* a name formed with more regard to euphony than to good construction, alluding to the glandless perianth.)

1. **A. muscætóxicum,** Gray. (FLY-POISON.) *Leaves broadly linear*, elongated, obtuse (½ – 1′ wide); *raceme simple;* capsule abruptly 3-horned; seeds oblong, with a fleshy red coat. — Open woods, N. J. to Fla., west to Ky. and Ark. June, July.

## ORDER 117. PONTEDERIÀCEÆ. (PICKEREL-WEED FAMILY.)

*Aquatic herbs, with perfect more or less irregular flowers from a spathe; the petal-like 6-merous perianth free from the 3-celled ovary; the 3 or 6 mostly unequal or dissimilar stamens inserted in its throat.* — Perianth with the 6 divisions colored alike, *imbricated* in 2 rows in the bud, the whole together sometimes revolute-coiled after flowering, then withering away, or the base thickened-persistent and enclosing the fruit. Anthers introrse. Ovules anatropous. Style 1; stigma 3-lobed or 6-toothed. Fruit a perfectly or incompletely 3-celled many-seeded capsule, or a 1-celled 1-seeded utricle. Embryo slender, in floury albumen.

1. **Pontederia.** Spike many-flowered. Perianth 2-lipped, its fleshy persistent base enclosing the 1-seeded utricle. Stamens 6.
2. **Heteranthera.** Spathe 1 – few-flowered. Perianth salver-shaped. Stamens 3. Capsule many-seeded.

### 1. PONTEDÈRIA, L. PICKEREL-WEED.

Perianth funnel-form, 2-lipped; the 3 upper divisions united to form the 3-lobed upper lip; the 3 lower spreading, and their claws, which form the lower part of the curving tube, more or less separate or separable to the base; after flowering the tube is revolute-coiled from the apex downward, and its fleshy-thickened persistent base encloses the fruit. Stamens 6; the 3 anterior long-exserted; the 3 posterior (often sterile or imperfect) with very short filaments, unequally inserted lower down; anthers versatile, oval, blue. Ovary 3-celled; two of the cells empty, the other with a single suspended ovule. Utricle 1-celled, filled with the single seed. — Stout herbs, growing in shallow water, with thick creeping rootstocks, producing erect long-petioled mostly heart-shaped leaves, and a 1-leaved stem, bearing a spike of violet-blue ephemeral flowers. Root-leaves with a sheathing stipule within the petiole. (Dedicated to *Pontedera*, Professor at Padua at the beginning of the last century.)

1. **P. cordàta**, L. Leaves arrow-heart-shaped, blunt, or sometimes triangular-elongated and tapering and scarcely cordate (var. ANGUSTIFÒLIA, Torr.); spike dense, from a spathe-like bract; upper lobe of perianth marked with a pair of yellow spots (rarely all white); calyx-tube in fruit crested with 6 toothed ridges. — N. Scotia to Fla., west to Minn. and Tex. July – Sept.

### 2. HETERANTHÈRA, Ruiz & Pav. MUD-PLANTAIN.

Perianth salver-form with a slender tube; the limb somewhat equally 6-parted, ephemeral. Stamens 3, in the throat, usually unequal; anthers erect. Capsule 1-celled or incompletely 3-celled by intrusion of the placentæ, many-seeded. — Creeping, floating or submerged low herbs, in mud or shallow water, with a 1 – few-flowered spathe bursting from the sheathing side or base of a petiole. (Name from ἑτέρα, *different*, and ἀνθηρά, *anther*.)

* *Stamens unequal; 2 posterior filaments with ovate yellow anthers; the other longer, with a larger oblong or sagittate greenish anther; capsule incompletely 3-celled; leaves rounded, long-petioled; creeping or floating plants.*

1. **H. renifórmis**, Ruiz & Pav. Leaves round-kidney-shaped to cordate and acute; spathe 3 – 5-flowered; flowers white or pale blue. — Conn. to N. J., west to Ill. and E. Kan., and southward. (S. Am.)

2. **H. limòsa**, Vahl. Leaves oblong or lance-oblong, obtuse at both ends; spathe 1-flowered; flowers larger, blue. — Va. to Mo. and La. (S. Am.)

* * *Stamens alike, with sagittate anthers; capsule 1-celled, with 3 parietal placentæ; leaves linear, translucent, sessile; submerged grass-like herbs, with only the flowers reaching the surface.*

3. **H. gramínea**, Vahl. The slender branching stems clothed with leaves and bearing a terminal 1-flowered spathe (becoming lateral); flowers small, pale yellow, with a very long thread-like tube. (Schollera graminifolia, *Willd.*) — N. Eng. to N. C., west to Minn. and E. Kan.

## ORDER 118. XYRIDÀCEÆ. (YELLOW-EYED-GRASS FAMILY.)

*Rush-like herbs, with equitant leaves sheathing the base of a naked scape, which is terminated by a head of perfect 3-androus flowers, with extrorse* *anthers, glumaceous calyx, and a regular colored corolla; the 3-valved mostly 1-celled capsule containing several or many orthotropous seeds with a minute embryo at the apex of fleshy albumen.*

### 1. XỲRIS, Gronov. Yellow-eyed Grass.

Flowers single in the axils of coriaceous scale-like bracts, which are densely imbricated in a head. Sepals 3; the 2 lateral glume-like, boat-shaped or keeled and persistent; the anterior one larger and membranaceous, enwrapping the corolla in the bud and deciduous with it. Petals 3, with claws, which cohere more or less. Fertile stamens 3, with linear anthers, inserted on the claws of the petals, alternating with 3 sterile filaments, which are cleft and in our species plumose or bearded at the apex. Style 3-cleft. Capsule oblong, free, 1-celled, with 3 parietal more or less projecting placentæ, 3-valved, many-seeded. — Flowers yellow, produced all summer. Ours apparently all perennials. (Ξυρίς, a name of some plant with 2-edged leaves, from ξυρόν, a *razor*.)

1. **X. flexuòsa,** Muhl. Scape slender (10–16′ high), barely flattened at the summit, often from a bulbous base, very smooth, much longer than the narrowly linear leaves, both commonly twisted with age; head roundish-ovoid (3–4″ long); *lateral sepals* oblong-lanceolate, *finely ciliate-scarious on the narrow wingless keel*, usually with a minute bearded tuft at the apex, shorter than the bract. — Sandy or peaty bogs, Mass. to Fla., west to Minn. and Mo.

Var. **pusílla,** Gray. Small and very slender, seldom twisted, 2–9′ high, the base not bulbous; head 2–3″ long. — White Mts. to Penn., west to L. Superior.

2. **X. tórta,** Smith. Scape terete, with one sharp edge, slender, 9–20′ high, from a dark bulbous base, and with the *linear-filiform rigid leaves* becoming spirally twisted; head ovoid, becoming spindle-shaped, or oblong and acute (5–9″ long); sepals exceeding the bract; *lateral sepals winged on the keel and fringed above the middle.* — Pine barrens, in dry sand, N. J. to Fla., Tex. and Ark.

3. **X. Caroliniàna,** Walt. Scape flattish, 1-angled below, 2-edged at the summit, smooth, ½–2° high, the base hardly bulbous; *leaves linear-sword-shaped, flat,* 2–4″ broad; head globular-ovoid (5–7″ long); *lateral sepals obscurely lacerate-fringed above on the winged keel,* rather shorter than the bract. — Sandy swamps, near the coast, Mass. to Fla.

4. **X. fimbriàta,** Ell. Scape somewhat angled, 2-edged above, rough (2° high), rather longer than the linear-sword-shaped or strap-shaped leaves, the base not bulbous; head oblong-ovate (6–10″ long); *lateral sepals* lanceolate-linear, *nearly twice the length of the bract, above the middle conspicuously fringed on the wing-margined keel, and even plumose at the summit.* — Pine-barrens, N. J. to Fla. and Tex.

## Order 119. MAYÀCEÆ. (Mayaca Family.)

*Moss-like aquatic plants, densely leafy, with narrowly-linear sessile pellucid leaves, axillary naked peduncles terminated by a solitary perfect 3-androus flower, herbaceous calyx, white corolla, and a 3-valved 1-celled several-seeded capsule.*

### 1. MAYÀCA, Aublet.

The only genus. Perianth persistent, of 3 herbaceous lanceolate sepals, and 3 obovate petals. Stamens alternate with the petals. Ovary with 3 parietal few-ovuled placentæ; style filiform; stigma simple. — Creeping or floating in shallow water; the leaves 1-nerved, entire, notched at the apex; the peduncle solitary, sheathed at base. (An aboriginal name.)

1. **M. Michaùxii,** Schott & Endl. Peduncles not much exceeding the leaves, nodding in fruit. — Va. to Fla. and Tex.

## ORDER 120. COMMELINÀCEÆ. (SPIDERWORT FAMILY.)

*Herbs, with fibrous or sometimes thickened roots, jointed and often branching leafy stems, and chiefly perfect and* 6*-androus, often irregular flowers, with the perianth free from the* 2–3*-celled ovary, and having a distinct calyx and corolla;* viz., 3 persistent commonly herbaceous sepals, and 3 petals, ephemeral, decaying or deciduous. Stamens hypogynous, some of them often sterile; anthers with 2 separated cells. Style 1; stigma undivided. Capsule 2–3-celled, 2–3-valved, loculicidal, 3–several-seeded. Seeds orthotropous. Embryo small, pulley-shaped, partly sunk in a shallow depression at the apex of the albumen. Leaves ovate, lanceolate or linear, parallel-veined, flat, sheathed at base; the uppermost often dissimilar and forming a kind of spathe. — Chiefly tropical.

1. **Commelina.** Cyme sessile within a cordate or connate bract (spathe). Petals unequal. Perfect stamens 3; filaments naked.
2. **Tradescantia.** Bracts leaf-like or small and scarious. Petals equal. Perfect stamens 6; filaments bearded.

### 1. COMMELÌNA, Dill. DAY-FLOWER.

Flowers irregular. Sepals somewhat colored, unequal; the 2 lateral partly united by their contiguous margins. Two lateral petals rounded or kidney-shaped, on long claws, the odd one smaller. Stamens unequal, 3 of them fertile, one of which is bent inward; 3 of them sterile and smaller, with imperfect cross-shaped anthers; filaments naked. Capsule 3-celled, two of the cells 2-seeded, the other 1-seeded or abortive. — Stems branching, often procumbent and rooting at the joints. Leaves contracted at base into sheathing petioles; the floral one heart-shaped and clasping, folded together or hooded, forming a spathe enclosing the flowers, which expand for a single morning and are recurved on their pedicel before and afterwards. Petals blue. Flowering all summer. Ours all with perennial roots, or propagating by striking root from the joints. (Dedicated to the early Dutch botanists *J.* and *G. Commelin.*)

* *Ventral cells* 2*-ovuled* (*usually* 2*-seeded*), *the dorsal* 1*-ovuled.*

1. **C. nudiflòra,** L. *Slender and creeping,* glabrous; leaves lanceolate, small (1–2′ long); spathe cordate, acute, *with margins not united; seeds reticulated.* (C. Cayennensis, *Richard.*) — Alluvial banks, Del. to Fla., west to Ind., Mo. and Tex.

2. **C. hirtélla,** Vahl. *Stout, erect* (2–4° high); leaves large, lanceolate, *the sheaths brown-bearded;* spathes crowded, *with margins united; seeds smooth.*

(C. erecta, *Gray*, Man., not *L.*) — River-banks, Penn. to Fla., west to Mo. and Tex.

* * *Cells* 1-*ovuled*, 1-*seeded ; seeds smooth ; spathe cucullate ; roots sub-tuberous.*

3. **C. eréeta,** L. Slender, often low; *leaves linear ; cells all dehiscent.* — Penn. to Fla.

4. **C. Virgínica,** L. Slender, usually tall; *leaves lanceolate* to linear; *dorsal cell indehiscent, scabrous.* — Damp rich woods and banks, southern N. Y. to Fla., west to Mich., Iowa, and Mo.

## 2. TRADESCÁNTIA, L. SPIDERWORT.

Flowers regular. Sepals herbaceous. Petals all alike, ovate, sessile. Stamens all fertile; filaments bearded. Capsule 2 – 3-celled, the cells 1 – 2-seeded. — Perennials. Stems mucilaginous, mostly upright, nearly simple, leafy. Leaves keeled. Flowers ephemeral, in umbelled clusters, axillary and terminal, produced through the summer; floral leaves nearly like the others. (Named for the elder *Tradescant*, gardener to Charles the First of England.)

* *Umbels terminal or sometimes lateral, sessile, subtended by* 1 *or* 2 *leaf-like bracts ; leaves linear to narrowly lanceolate ; flowers blue.*

1. **T. Virgínica,** L. (COMMON SPIDERWORT.) Roots fleshy-fibrous; smooth or only slightly villous, more or less glaucous, often tall and slender and with linear leaves, rather rarely with 1 or 2 long lateral peduncles, bracts usually a pair. — Rich ground, N. Y. to Fla., west to Minn., Tex., and the Rocky Mts. Very variable. — Var. VILLÒSA, Watson. Often dwarf, more or less villous throughout as well as pubescent. Mississippi valley and Gulf States. — Var. FLEXUÒSA, Watson. Stout and dark green, with large linear-lanceolate pubescent leaves, the stem usually flexuous, and with several short lateral branches or sessile axillary heads. (T flexuosa, *Raf.*) — Ohio to Ky. and Ga. T. pilosa, *Lehm.*, is an intermediate form.

* * *Umbel pedunculate, subtended by small subscarious bracts ; flowers small, rose-color.*

2. **T. ròsea,** Vent. Small, slender (6 – 10′ high), smooth, erect from a running rootstock; leaves very narrowly linear, grass-like. — Sandy woods, Md. to Fla., west to Ky. and Mo.

## ORDER 121. JUNCACEÆ. (RUSH FAMILY.)

*Grass-like or rush-like herbs, with small flowers, a regular and hypogynous persistent perianth of* 6 *similar glumaceous sepals*, 6 *or rarely* 3 *stamens with* 2-*celled anthers, a single short style,* 3 *filiform hairy stigmas, and an ovary either* 3-*celled or* 1-*celled with* 3 *parietal placentæ, forming a loculicidal* 3-*valved capsule.* Seeds anatropous, with a minute embryo enclosed at the base of the fleshy albumen. — Flowers liliaceous in structure, but sedge-like in aspect and texture.

1. **Juncus.** Capsule 3-celled (or imperfectly so), many-seeded. Plants never hairy, in moist ground or water.
2. **Luzula.** Capsule 1-celled, 3-seeded. Plants often hairy, in dry ground.

## 1. **JÚNCUS,** Tourn. Rush. Bog-Rush.

Capsule many-seeded, 3-celled, or 1-celled by the placentæ not reaching the axis. Stamens when 3 opposite the 3 outer sepals. — Chiefly perennials, and in wet soil or water, with pithy or hollow and simple (rarely branching) stems, and panicled or clustered small (greenish or brownish) flowers, chiefly in summer. Plant never hairy. (The classical name, from *jungo*, to join, alluding to the use of the stems for bands.)

§ 1. *Stems leafless and scape-like, from matted running rootstocks, sheathed at base; the sheaths sometimes bearing terete knotless leaves like the scape; flowers in sessile apparently lateral panicles, the involucral leaf being similar to and continuing the scape.* — Juncus proper.

* *Flowers solitary on the pedicels or ultimate ramifications of the panicle.*

+– *Sheaths at base of the stem leafless.*

++ *Stamens* 3.

1. **J. effùsus,** L. (Common or Soft Rush.) Scape soft and pliant (2–4° high); inner sheaths awned; panicle diffusely much branched, many-flowered; flowers small ($1\frac{1}{4}''$ long), greenish; sepals lanceolate, very acute, as long as the narrow triangular-obovate retuse and pointless greenish-brown capsule; anthers as long as the filaments; style very short; seeds small (about $\frac{1}{4}''$ long), with short pale points. — Marshy ground, very common. (Eu.) — Var. conglomeràtus, Engelm. Scape more distinctly striate; panicle closely crowded; capsule short-pointed. In sphagnous swamps.

++ ++ *Stamens* 6.

2. **J. filifórmis,** L. Scape very slender (1–2° high), pliant; panicle few-flowered, almost simple; flowers $1\frac{1}{2}''$ long; sepals lanceolate, the inner a little shorter and less acute, longer than the broadly ovate obtuse but mucronate greenish capsule; anthers shorter than the filaments; style very short; seed (less than $\frac{1}{3}''$ long) short-pointed at both ends, indistinctly reticulated. — N. Eng. to Mich., Neb., and northward. (Eu.)

3. **J. Smíthii,** Engelm. Scape rather slender (2–3° high); panicle few-flowered, nearly simple; flowers brown ($1\frac{1}{4}''$ long); outer sepals lanceolate, acute, the inner a little shorter, obtusish, shorter than the broadly ovate rather triangular acute deep chestnut-brown capsule; anthers as long as the filaments; style short; seeds large ($\frac{1}{3}''$ long or more), obtuse, short-appendaged at both ends, many-ribbed and reticulated. — Sphagnous swamps, on Broad Mt. and in Lebanon Co., Penn.

4. **J. Bálticus,** Dethard, var. **littoràlis,** Engelm. Scape rigid (2–3° high); panicle loose; flowers larger ($2''$ long), chestnut-brown with green; sepals ovate-lanceolate, the outer sharp-pointed, the inner obtusish, as long as the elliptical rather triangular obtuse and mucronate deep brown capsule; anthers much longer than the broad filaments; style about the length of the ovary; seeds rather large ($\frac{1}{2}''$ long or more), nearly obtuse, delicately ribbed and cross-lined. — Sandy shores, Newf. to Mass., west to Penn., along the Great Lakes, and westward. — Var. montànus, Engelm. Sepals nearly equal; anthers 4 times longer than the filament; capsule ovate-pyramidal, angled, beaked; seeds smaller, narrower, apiculate. — Minn., west and northward.

+ + *Innermost sheaths leaf-bearing; stamens* 6.

5. **J. setàceus,** Rostkovius. Scape slender (1 – 3° high); panicle loose, rather few-flowered; flowers greenish (2″ long); sepals lanceolate, sharp-pointed, especially the 3 shining exterior ones, spreading in fruit, as long as the nearly globose beak-pointed greenish or light-brown capsule; anthers as long as the filaments; style conspicuous; seeds (⅓″ long) almost globose, ribbed and cross-lined. — Va. to Fla., west to Mo. and La.

* * *Flowers in clusters,* 6-*androus; innermost sheaths at base of stem leaf-bearing*

6. **J. Rœmeriànus,** Scheele. Scape stout and rigid (2 – 3° high), its apex as well as the leaves pungent; panicle compound, open and spreading, brown; 3 – 6 greenish or light-brown flowers (1½″ long) in a cluster; outer sepals lanceolate, sharp-pointed, longer than the obtusish inner ones, as long as the elliptical rather triangular obtuse mucronate brown capsule; anthers much longer than the broad filaments; styles shorter than the ovary; seeds (⅓″ long) oval, obtuse, very delicately ribbed. — Brackish marshes, N. J. to Fla. and Tex.

7. **J. marítimus,** L. Resembling the last, but with a rigid contracted green panicle, an ovary attenuated into a style of nearly its own length, a greenish acute capsule which usually exceeds the acute sepals, and seeds with distinct tails and stronger ribs. — Known in this country only from Coney Island, N. Y., where it is apparently indigenous. (Eu.)

§ 2. *Stems simple* (*rarely branched*), *leafy at base or throughout; leaves flat, or somewhat terete or setaceous and channelled, never knotted; panicle or head terminal.* — GRASSY-LEAVED JUNCI.

* *Flowers in close heads* (*produced in late summer*).

+ *Leaves thread-like, hollow; stamens* 6; *seeds few, large and caudate; the single head* (*sometimes* 2) 1 – 4-*flowered.*

8. **J. stýgius,** L. Stems slender (6 – 16′ high) from slender branching rootstocks, 1 – 3-leaved below, naked above; heads 1 or rarely 2, of 3 – 4-flowers, about the length of the sheathing scarious awl-pointed bract; flowers pale and reddish (2½ – 3″ long); sepals lanceolate, the inner obtusish, ¾ the length of the oblong acuminate capsule, as long as the slender stamens; filaments many times longer than the oblong anthers; recurved stigmas shorter than the style; seeds oblong, with a very loose coat prolonged at both ends (1½″ long). — Peat-bogs, Newf. to northern N. Y., west to Mich. and N. Minn. (Eu.)

9. **J. trífidus,** L. Stems densely tufted from matted creeping rootstocks, erect (5 – 10′ high), sheathed and mostly leafless at base, 2 – 3-leaved at the summit, the upper thread-like leaves subtending the sessile head; flowers brown (1½ – 2″ long); sepals ovate-lanceolate, acute, equalling or rather shorter than the ovate beak-pointed deep brown capsule; anthers much longer than the filaments; seeds few, oblong, angled (1″ long), short-tailed. — Alpine summits of N. Eng. and N. Y., and far northward; also in N. J. (Eu.)

+ + *Leaves flat and grass-like; stamens* 3; *stems flattened, simple, leafy.*

10. **J. rèpens,** Michx. Stems ascending (4 – 6′ high) from a fibrous annual root, at length creeping or floating; leaves short, linear, those of the stem nearly opposite and fascicled; heads few in a loose leafy panicle, 3 – 12-flow-

ered; flowers green (3″ long); sepals rigid, lance-subulate, slender-pointed, the 3 outer as long as the linear triangular obtuse capsule, the inner much longer; stamens as long as the outer sepals; filaments many times longer than the oblong anthers; seeds small (⅕″ long), obovate, slightly pointed, very delicately ribbed and cross-lined. — Miry banks, Md. to Fla. and La.

11. **J. marginàtus,** Rostk. Stem erect, from a bulbous and stoloniferous base (1 – 3° high); leaves long-linear; heads 3 – 8-flowered, panicled; flowers purplish with green (1½″ long); sepals oblong, the 3 outer acute and slightly awned, the inner longer, mostly obtuse, as long as the almost globular scarcely mucronate capsule; stamens exceeding the outer sepals; purple anthers shorter than the filaments; style very short; seeds (¼ – ⅓″ long) slender, pointed at both ends and strongly ribbed. — Moist sandy places, S. New Eng. to Fla., west to Mich., Mo., and Tex. — Var. PAUCICAPITÀTUS, Engelm., has few large 8 – 15-flowered heads; and var. BIFLÒRUS, Engelm., has numerous small 2 – 3-flowered heads in much-branched panicles.

* * *Flowers solitary, panicled; stamens* 6.

+ *Stems slender, simple, tufted, leafy below; root perennial* (*fl. early in summer*).

++ *Seeds tail-pointed at both ends.*

12. **J. Vàseyi,** Engelm. Stems rigid (1 – 2½° high); leaves nearly terete, very slightly channelled on the inner side; panicle longer than the involucral leaf, loose; flowers few, often one-sided, greenish or light brown (2″ long or more); sepals lanceolate, acute, appressed, shorter than the oblong and retuse green-brown capsule; anthers as long as the filaments; style very short; seeds slender (½ – ⅔″ long), closely ribbed. — N. Maine (*Pringle*); Mich. to Iowa and westward.

13. **J. Greénii,** Oakes & Tuckerm. Stems rigid (1 – 2° high); leaves nearly terete, very deeply channelled (almost involute) on the inner side; panicle usually much shorter than the principal erect involucral leaf, dense, the numerous flowers often one-sided (1¾″ long); sepals lanceolate, acute, light greenish-brown, appressed, shorter than the ovoid-oblong obtuse greenish-brown capsule; anthers as long as the filaments; style very short; seeds ovoid (⅓ – ⅖″ long), ribbed and delicately cross-lined. — Sandy coast of N. Eng, N. Y., and N. J., and about the head of Lake Michigan.

++ ++ *Seeds merely apiculate at both ends.*

14. **J. ténuis,** Willd. Stem wiry (9 – 18′ high); leaves flat or channelled; panicle shorter than the involucral leaves, loose, or rarely crowded; flowers green (2″ long or more); sepals lanceolate, very acute, spreading in fruit, longer than the ovoid retuse scarcely pointed green capsule; anthers nearly equal to the filaments; style very short; seeds small (about ¼″ long), delicately ribbed and cross-lined. — Fields and roadsides, very common. (Eu.) — Var. SECÚNDUS, Engelm.; flowers smaller, secund along the incurved branches. N. Eng. to Penn. and Del. — Var. CONGÉSTUS, Engelm.; branches contracted into a head and the flowers darker-colored. Minn. and westward.

15. **J. dichótomus,** Ell. Stems rigid (1½ – 2° high) from a tumid base; leaves filiform, nearly terete, slightly grooved on the inner side; panicle loose, often with 1-sided forked branches, mostly longer than the involucral leaf; flowers greenish (2″ long or more); sepals lanceolate, sharp-pointed, spread-

ing in fruit, as long as the globular beaked light mahogany-colored capsule, anthers nearly as long as the filaments; style short; seeds small (⅕ – ¼″ long), coarsely cross-lined. — Low sandy grounds, N. J. to Fla.

16. **J. Gerárdi,** Loisel. (BLACK-GRASS.) Stems scarcely flattened, rigid (1 – 2° high); panicle contracted, usually longer than the bracteal leaf; flowers chestnut-brown with green (1¾″ long); sepals oval-oblong, obtuse, incurved, as long as the oval obtuse and mucronate capsule; anthers much longer than the short filaments; style as long as the ovary; seeds (nearly ⅛″ long) obovate, delicately ribbed and cross-lined. — Salt marshes; common along the coast and in W. New York; rare about the Great Lakes. (Eu.)

+ + *Stems branched, diffuse, leafy; root annual, fibrous.*

17. **J. bufònius,** L. Stems low and slender (3 – 9′ high), leafy, often branched from the base; panicle spreading, mostly with one-sided dichotomous branches; flowers remote, greenish (2 – 3½″ long); sepals linear-lanceolate, awl-pointed, the 3 outer much exceeding the inner and the oblong obtuse capsule; stamens short; filaments scarcely longer than the anthers, seeds elliptical, obtuse (⅕ – ⅙″ long). — Low grounds, by roadsides; common. (Eu.)

§ 3. *Stems leafy; leaves terete or laterally flattened, more or less distinctly knotted by internal transverse partitions; panicle terminal, with flowers chiefly in heads.* — KNOTTY-LEAVED JUNCI.

* *Seeds barely pointed, not caudate.*

+ *Flowers solitary or 2 together, panicled; stamens* 6.

18. **J. pelocárpus,** E. Meyer. Stems slender and erect from a slender running rootstock (6 – 18′ high), bearing few thread-like slightly knotted leaves, branching above into a compound spreading panicle, bearing the flowers in the forks and along one side of the branches; often with the flowers or in place of them are tufts of leaves; flowers small (1 – 1¼″ long), greenish with red; sepals oblong, obtuse, the 3 inner ones longer, but shorter than the oblong taper-beaked, 1-celled capsule; anthers much longer than the filaments; style slender; seeds (¼″ long) obovate, short-pointed. — Sandy, wet or swampy places, Newf. to Fla., west along the Great Lakes to Minn. The proliferous plants are usually sterile and much larger, with larger diffuse panicles. — Var. SÚBTILIS, Engelm. Creeping or floating, with a single pair of flowers at the end of the short stems. — Somerset Co., Maine (*C. E. Smith*); Canada.

+ + *Heads numerous, of* 3 – 12-*flowers (rarely more); in early summer.*

++ *Stamens* 6.

19. **J. articulàtus,** L. Stems ascending or erect (9 – 15′ high), tufted from a short creeping rootstock, with 1 or 2 slender leaves; panicle short, spreading, the crowded heads 3 – 8-flowered; flowers brown, rarely pale (1¼ – 1½″ long); sepals lance-oblong, acute or mucronate, or the 3 inner obtuse and a little longer, shorter than the ovate-oblong acute or abruptly mucronate-pointed incompletely 3-celled commonly deep chestnut-brown shining capsule; anthers as long as the filaments; ovary attenuate into a short style; seeds (less than ⅓″ long) obovate, attenuate below, abruptly pointed above. — Wet grounds, Newf. to Del., west to western N. Y. and Mich. (Eu.)

20. **J. alpìnus,** Villars, var. **insígnis,** Fries. Stems erect (9 – 18′ high) from a creeping rootstock, with 1 or 2 slender leaves; panicle meagre, with erect branches bearing distant greenish or light-brown heads, each of 3 – 6 flowers (1¼ – 1½″ long); sepals oblong, obtuse, the outer mucronate or cuspidate and usually longer than the rounded inner ones, as long as or shorter than the obtuse short-pointed incompletely 3-celled light-brown capsule; anthers as long as the filaments; style short; seeds (⅓″ or more in length) spindle-shaped. — Wet sandy banks, L. Champlain, Cayuga Lake, along the Great Lakes, and far west and northward. (Eu.)

21. **J. militàris,** Bigel. Stem stout (2 – 4° high) from a thick creeping rootstock, bearing a solitary stout erect leaf (½ – 3½° long) below the middle, which overtops the crowded and rather contracted panicle; heads numerous, 5 – 12- (rarely 25-) flowered; flowers brownish (1½″ long); sepals lanceolate, the outer awl-pointed, as long as the ovate-oblong triangular taper-beaked 1-celled capsule; anthers longer than the filaments; ovary attenuate into a slender style; seeds (¼ – ⅓″ long) globose-obovate, obtuse, abruptly pointed. — In bogs and streams, Maine to Md. Sometimes producing, in flowing water, numberless capillary submersed leaves, 2 – 3° long, from the rootstock.

++ ++ *Stamens* 3.

22. **J. acuminàtus,** Michx. Stems tufted, erect, slender (1 – 2° long), bearing about 2 leaves and a very loose spreading panicle; heads rather few and large, 5 – many-flowered, greenish, at length straw-colored or darker; sepals lance-awl-shaped, sharp-pointed, equal (1½ – 2″ long), as long as the triangular-prismatic short-pointed 1-celled straw-colored or light brown capsule; anthers a little shorter than the filaments; style almost none; seeds small (⅕ – ¼″ long), acute at both ends, ribbed-reticulated. — N. Eng. to Ga., Minn. and Tex. May, June. Very variable. Heads often proliferous in autumn.

Var. **débilis,** Engelm. Stems slender (9 – 18′ high); heads green, 3 – 6-flowered, in a loose panicle; flowers smaller (1¼ – 1½″ long); capsule longer than the sepals. — Wet sandy soil, N. J. to S. C., west to Ohio, Mo., and Miss. Stem sometimes decumbent and rooting.

Var. **robústus,** Engelm. Stems stout, tall (2 – 4° high), bearing numerous 5 – 8-flowered light-brown heads in a large much-branched panicle; flowers small (1 – 1⅕″ long); ovoid capsule scarcely longer than the sepals. — Deep swamps, Ill. to Mo. and La.

+ + + *Heads few, crowded, of numerous flowers.*

++ *Stamens* 3; *stem rigid from a thick white horizontal rootstock.*

23. **J. brachycárpus,** Engelm. Stem erect (1 – 2½° high), bearing about 2 leaves and 2 – 10 densely flowered spherical heads (4 – 5″ wide) in a slightly spreading crowded panicle much exceeding the involucral leaf; flowers pale green (2″ long); sepals lance-linear, awl-pointed, the 3 outer much longer than the inner, and the ovoid pointed 1-celled capsule rather shorter; anthers much shorter than the filaments; style very short; seeds (⅕″ long) abruptly apiculate. — Moist places in open woods and prairies, Ohio and Mich. to Mo., Miss., and Tex.

24. **J. scirpoìdes,** Lam. Stem erect (1 – 3° high), rather slender, bearing about 2 terete leaves with wide and open sheaths, and a panicle of few or

many densely-flowered pale-green spherical heads, much longer than the involucral leaf, its branches erect and often elongated; heads (3–4″ wide) 15–40-flowered; flowers 1¼–1½″ long; sepals rigid, awl-shaped and (especially the outer) bristly pointed, at length pungent, as long as the stamens and nearly equalling the oblong-triangular taper-pointed 1-celled capsule; anthers very small; style elongated or very short; seeds ovoid, abruptly pointed at each end (¼″ long). — Wet sandy soil, Mass. to N. J. and S. C., west to Ind., Mo., and Tex.

Var. **echinàtus,** Engelm. Stouter; leaves terete; branches of the compact panicle short; heads larger (5–6″ wide), 40–80-flowered; flowers 1¾–2″ long); sepals narrower and more sharply pointed, the outer a little longer than the inner; stamens shorter and anthers longer than in the preceding, and seeds rather smaller and more slender. — Md. to Fla.

Var. **polycéphalus,** Engelm. Much stouter; leaves laterally flattened (3–6″ wide); panicle spreading, branched, bearing many distant heads as large as in the last; flowers 2–2½″ long; the 3 outer sepals the longer; anthers about as long as the filaments; seeds larger (⅓″ long). — S. Va. to Fla., west to Mo. and Tex.

++ ++ *Stamens* 6.

25. **J. nodòsus,** L. Stem erect (6–15′ or 2° high), slender from a creeping thread-like and tuber-bearing rootstock, mostly with 2 or 3 slender leaves; heads few or several, rarely single, 8–20-flowered (3½–4″ wide), overtopped by the involucral leaf; flowers brown (1½–2″ long); sepals lance linear, awl-pointed (the 3 outer mostly a little shorter), nearly as long as the slender triangular taper-pointed 1-celled capsule; anthers oblong, shorter than the filaments; style very short; seeds (about ¼″ long) obovate, abruptly mucronate. — Swamps and gravelly banks, N. J. and Penn. to N. Ind. and Iowa, and northward. — July, Aug. — Var. MEGACÉPHALUS, Torr. Stem stout (1–3° high), with thick leaves; heads few and large (6–8″ wide), 30–80-flowered; flowers pale green (2¼–2¾″ long); outer sepals longest; anthers linear, shorter than the filaments. — Western N. Y. to Minn. and Mo., and westward.

* * *Seeds caudate.*

+ *Stamens* 3.

26. **J. Canadénsis,** J. Gay. Tufted stems erect, terete, smooth, bearing 2–3 leaves; heads few- or many-flowered, paniculate; sepals lanceolate, the 3 outer shorter than the inner, not much longer than the stamens, equal to or shorter than the triangular-prismatic almost 1-celled usually short-pointed capsule; style mostly short; seeds more or less distinctly tail-pointed, delicately many ribbed. — Common almost everywhere. Aug., Sept. Easily distinguished by its late flowering from the similar n. 22. Very variable.

Var. **longicaudàtus,** Engelm. Stem stout and rigid (1½–3° high), bearing in a decompound somewhat spreading panicle the numerous 5–50-flowered heads; flowers greenish or light brown (1½–2″ long); sepals awl-pointed, mostly shorter than the abruptly short-pointed capsule; seeds slender (¾–1″ long), conspicuously tail-pointed. — Maine to S. C., west to Minn. and La. The most common form.

Var. **subcaudàtus,** Engelm. Stem slender, often decumbent (1–2° high), bearing in simpler spreading panicles fewer 8–20-flowered heads;

flowers greenish, as large as in the last; sepals awl-shaped, but not so rigid; capsule mostly tapering; seeds large (½ – ⅗″ long), with short white membranous appendages, not reticulated. — Conn. to Penn. and Ga.

Var. **brachycéphalus,** Engelm. Stem slender (1½ – 2½° high), bearing numerous small 3 – 5-flowered heads in a large spreading panicle; flowers greenish or light brown (1¼ – 1½″ long); sepals mostly obtuse, shorter than the brown abruptly short-pointed capsule; style longer than in other forms; seeds smaller (¼ – ⅓″ long), slender, with rather short appendages. — Penn. and western N. Y., to Wisc. and Ill.

Var. **coarctàtus,** Engelm. Stem slender, shorter (9 – 18′ high), bearing fewer deep-brown 3 – 5-flowered heads in a somewhat erect contracted panicle; flowers as large as in the last; sepals acute, or rarely obtusish, much shorter than the prismatic abruptly pointed deep-brown capsule; seeds as in the last. — N. Eng. to N. J., N. Minn., and westward.

+ + *Stamens* 6.

27. **J. ásper,** Engelm. Stems tufted, erect (2 – 3° high), terete, stout, rigid, and with the rigid leaves rough; panicle with rigid slightly spreading branches, bearing scattered few- (2 – 6-) flowered heads; flowers greenish with brown (2½″ long); sepals ovate-lanceolate, awl-pointed, rigid and strongly nerved, the outer much shorter than the inner, these a little shorter than the triangular-ovoid beaked incompletely 3-celled brown capsule; ovary tapering into a conspicuous style; seeds large, oblong, with white or often reddish appendages (1¼″ long). — Sphagnous swamps, N. J. Aug.

## 2. LÙZULA, DC. Wood-Rush.

Capsule 1-celled, 3-seeded, one seed to each parietal placenta. — Perennials, often hairy, usually in dry ground, with flat and soft usually hairy leaves, and spiked-crowded or umbelled flowers. (From *Gramen Luzulæ*, or *Luxulæ*, dim. of *lux*, light, — a name given to one of the species from its shining with dew.)

* *Pedicels* 1-*flowered, in a loose compound cyme or umbel.*

1. **L. vernàlis,** DC. Plant 6 – 9′ high; leaves lance-linear, hairy; *umbel mostly simple;* sepals pointed, shorter than the obtuse capsule; seeds with a curved appendage. (L. pilosa, *Willd.*) — Woods and banks, Newf. to the mountains of N. C., west to Minn. (Eu.)

2. **L. spadícea,** DC., var. **melanocárpa,** Meyer. Nearly smooth (1 – 3° high); leaves broadly linear; *corymb decompound, loose; pedicels drooping;* sepals pointed, straw-color, about the length of the minutely pointed and brown capsule; seeds not appendaged. (L. parviflora, var. melanocarpa, *Gray.*) — Mountains of Maine, Vt., and northern N. Y., to Mich. and N. Minn. (Eu.)

* * *Flowers crowded in spikes or close clusters.* (*Plants* 6 – 12′ *high.*)

3. **L. campéstris,** DC. *Leaves flat, linear; spikes* 4 – 12, *somewhat umbelled,* ovoid, straw-color, some of them long-peduncled, others nearly sessile; sepals bristle-pointed, longer than the obtuse capsules; seeds with a conical appendage at base. — Dry fields and woods, common. May. (Eu.)

4. **L. arcuàta,** Meyer. *Leaves channelled,* linear; *spikes* 3 – 5, *on unequal often recurved peduncles,* ovoid, chestnut-brown; bracts ciliate-fringed; sepals

taper-pointed, longer than the obtuse capsule; seeds not appendaged. — Alpine summits of the White Mts. and far northward. (Eu.)

5. **L. spicàta,** Desvaux. *Leaves channelled*, narrowly linear; *flowers in sessile clusters, forming a nodding interrupted spiked panicle*, brown; sepals bristle-pointed, scarcely as long as the abruptly short-pointed capsule; seeds merely with a roundish projection at base. — With the last, and more common. (Eu.)

## ORDER 122. TYPHÀCEÆ. (CAT-TAIL FAMILY.)

*Marsh or aquatic herbs, with nerved and linear sessile leaves, and monœcious flowers on a spadix or in heads, destitute of proper floral envelopes.* Ovary 1 – 2-celled, with as many persistent styles and (usually elongated) 1-sided stigmas; cells 1-ovuled. Fruit nut-like when ripe, 1-seeded, rarely 2-seeded. Seed suspended, anatropous; embryo straight in copious albumen. Root perennial.

1. **Typha.** Flowers in a cylindrical compact terminal spike; spathe-like bract deciduous.
2. **Sparganium.** Flowers in globular heads with foliaceous bracts.

### 1. TÝPHA, Tourn. (CAT-TAIL FLAG.)

Flowers in a long and very dense cylindrical spike terminating the stem; the upper part consisting of stamens only, inserted directly on the axis, and intermixed with long hairs; the lower part consisting of stipitate 1-celled ovaries, the stipes bearing club-shaped bristles, which form the copious down of the fruit. Nutlets minute, very long-stalked. — Spathes merely deciduous bracts, or none. Root-stocks creeping. Leaves long, sheathing the base of the simple jointless stems, erect, thickish. Flowering in summer. (Τύφη, the old Greek name.)

1. **T. latifòlia,** L. (COMMON CAT-TAIL.) Stout and tall (4 – 6° high), the flat sheathing leaves 3 – 10″ broad, exceeding the stem; the staminate and dark brown pistillate parts of the spike (each 3 – 6′ long or more) *usually contiguous*, the latter at length 1′ in diameter; *pistillate flowers without bractlets; stigma rhombic-lanceolate; pollen-grains in fours.* — In marshes, throughout N. Am. (Eu.)

2. **T. angustifòlia,** L. Leaves narrower (3 – 6″ broad), taller, somewhat convex on the back; pistillate and staminate inflorescence usually separated by a short interval, the light brown spike becoming 5 – 6″ in diameter; *pollen-grains simple; pistillate flowers with a linear stigma and a hair-like bractlet* slightly dilated at the summit. — N. Eng. to N. J., west to Mich. and Mo.; less frequent, and mainly near the coast. (Eu.)

### 2. SPARGÀNIUM, Tourn. BUR-REED.

Flowers collected in separate dense and spherical leafy-bracted heads, which are scattered along the summit of the stem; the upper sterile, consisting merely of stamens, with minute scales irregularly interposed; the lower or fertile larger, consisting of numerous sessile 1 – 2-celled pistils, each surrounded by 3 – 6 scales much like a calyx. Fruit wedge-shaped or club-shaped, more or less corky toward the summit, the hard endocarp perforated at the apex. —

Rootstocks creeping and stoloniferous; roots fibrous. Stems simple or branching, sheathed below by the base of the linear leaves. Flowering through the summer. (Name from σπάργανον, *a fillet*, from the ribbon-like leaves.)

* *Fruit sessile, broad and truncate, often 2-seeded; stigmas often 2, elongated; scales rigid, nearly equalling the fruit; erect, with branched inflorescence.*

1. **S. eurycárpum,** Engelm. Stems stout, erect (2–4° high); leaves mostly flat and merely keeled; pistil attenuate into a short style bearing 1 or 2 elongated stigmas; fruit-heads 2–6 or more, 1′ wide; fruit many-angled (3½–4″ long) when mature, with a broad and depressed or retuse summit abruptly tipped in the centre. — Borders of ponds, lakes, and rivers, N. Eng. to Va., west to the Pacific.

* * *Fruit comparatively narrow, and mostly somewhat stipitate, 1-celled, longer than the scales.*

2. **S. símplex,** Huds. *Stems slender, erect* (½–2° high); *leaves more or less triquetrous* (2½–4″ wide); fertile heads (1–4) of the usually simple inflorescence often above the axils, sessile or peduncled, 6–8″ wide in fruit; stigma linear, equalling the rather slender style or shorter; nutlets pale, *fusiform* or narrowly oblong (about 2″ long), more or less contracted in the middle. — N. Eng. to N. J., west to Mich., Minn., and northward. (Eu.)

Var. **andrócladum,** Engelm. Stouter (1½–3° high), with usually *broader leaves* (4–9″) and *branching inflorescence*, the head or peduncles axillary or nearly so; fruiting *heads* (1–7) often *larger* (6–12″ broad), the nutlets 2–3″ long. (S. androcladum, *Morong.*) — In bogs or shallow water, common; N. Eng. to Fla., west to Minn. and Mo.

Var. **angustifòlium,** Engelm. Very slender; leaves floating, long and narrow (½–2½″ wide), flat; inflorescence simple; heads (4–6″ broad) and nutlets smaller. — Mountain lakes and slow streams, N. Y., N. Eng., and northward; sometimes nearly out of water, dwarf and with shorter erect leaves.

Var. **flùitans,** Engelm. Floating in deep water, with long slender stems and flat narrow leaves; inflorescence usually short, sparingly branched; style stout with a short oval stigma; fruiting heads 4–6″ broad; nutlets dark, as large as in the type. (S. androcladum, var. fluctuans, *Morong.*; not S. fluitans, *Fries.*) — Ponds, Penn., W. Conn., White Mts., N. Minn., and northward.

3. **S. mínimum,** Fries. *Usually floating, with very slender stems and thin flat narrow leaves;* fertile heads 1 or 2, axillary, sessile or peduncled (4–5″ wide); stigma oval, about as long as the short style, scarcely surpassing the oval or obovate denticulate scales; *fruit oblong-obovate* (1–2″ long), pointed, somewhat triangular, the stipe very short or none. — N. Eng. to Penn., N. Ind., Minn., north and westward. — Stems 3–6′ high when growing out of water, much longer when submerged. (Eu.)

## ORDER 123. ARÀCEÆ. (ARUM FAMILY.)

*Plants with acrid or pungent juice, simple or compound often veiny leaves, and flowers crowded on a spadix, which is usually surrounded by a spathe.* — Floral envelopes none, or of 4–6 sepals. Fruit usually a berry. Seeds with fleshy albumen, or none, but filled with the large fleshy embryo. A large family, chiefly tropical. Herbage abounding in slender rhaphides. — The genuine Araceæ have no floral envelopes, and are almost all monœcious or diœcious; but the genera of the second section, with more highly developed flowers, are not to be separated.

* Spathe surrounding or subtending the spadix; flowers naked, i. e. without perianth.

1. **Arisæma.** Flowers monœcious or diœcious, covering only the base of the spadix.
2. **Peltandra.** Flowers monœcious, covering the spadix; anthers above, ovaries below.
3. **Calla.** Flowers perfect (at least the lower ones), covering the whole of the short spadix. Spathe open and spreading.

* * Spathe surrounding the spadix in n. 4, none or imperfect in the rest; flowers with a calyx or perianth and perfect, covering the whole spadix.

4. **Symplocarpus.** Spadix globular, in a fleshy shell-shaped spathe. Stemless.
5. **Orontium.** Spadix narrow, naked, terminating the terete scape.
6. **Acorus.** Spadix cylindrical, borne on the side of a leaf-like scape.

### 1. ARISÆ̀MA, Martius. INDIAN TURNIP. DRAGON ARUM.

Spathe convolute below and mostly arched above. Flowers monœcious or by abortion diœcious, covering only the base of the spadix, which is elongated and naked above. Floral envelopes none. Sterile flowers above the fertile, each of a cluster of almost sessile 2–4-celled anthers, opening by pores or chinks at the top. Fertile flowers consisting each of a 1-celled ovary, tipped with a depressed stigma, and containing 5 or 6 orthotropous ovules erect from the base of the cell; in fruit a 1–few-seeded scarlet berry. Embryo in the axis of albumen. — Low perennial herbs, with a tuberous rootstock or corm, sending up a simple scape sheathed with the petioles of the simple or compound veiny leaves. (Name from ἀρίς, a kind of *arum*, and αἷμα, *blood*, from the spotted leaves of some species.)

1. **A. triphýllum,** Torr. (INDIAN TURNIP.) *Leaves mostly* 2, *divided into* 3 *elliptical-ovate pointed leaflets; spadix mostly diœcious, club-shaped,* obtuse, much shorter than the spathe, which is flattened and incurved-hooded at the ovate-lanceolate, pointed summit. — Rich woods, N. Scotia to Fla., west to Minn. and E. Kan. May. — Corm turnip-shaped, wrinkled, farinaceous, with an intensely acrid juice; spathe with the petioles and sheaths green, or often variegated with dark purple and whitish stripes or spots.

2. **A. Dracóntium,** Schott. (GREEN DRAGON. DRAGON-ROOT.) *Leaf usually solitary, pedately divided* into 7–11 oblong-lanceolate pointed leaflets; *spadix often androgynous, tapering to a long and slender point* beyond the oblong and convolute pointed greenish spathe. — Low grounds, N. Eng. to Fla., west to Minn., E. Kan., and Tex. June. — Corms clustered; petiole 1–2° long, much longer than the peduncle.

### 2. PELTÁNDRA, Raf. ARROW ARUM.

Spathe elongated, convolute throughout or with a dilated blade above. Flowers monœcious, thickly covering the long and tapering spadix throughout (or only its apex naked). Floral envelopes none. Anther-masses sessile, naked, covering all the upper part of the spadix, each of 4–6 pairs of cells imbedded in the margin of a thick and shield-shaped connective, opening by terminal pores. Ovaries at the base of the spadix, each surrounded by 4–5 distinct, scale-like, white staminodia, 1-celled, bearing 1–few amphitropous ovules at the base; stigma truncate. Fruit a leathery or fleshy berry, 1 – 3-seeded. Seed obovate, surrounded by tenacious jelly, the base empty, the upper part filled with a large fleshy spherical embryo; no albumen. — Stemless herbs, with arrow-shaped or hastate leaves, palmately 3-nerved and pinnately veined, and simple scapes from a thick-fibrous or subtuberous root. Fruit in a globose cluster, enclosed by the persistent fleshy base of the spathe. (Name from *πέλτη, a target*, and *ἀνήρ*, for *stamen*, from the shape of the latter.)

1. **P. undulàta,** Raf. Root of thick tufted fibres; scape 1 – 1½° high, about equalling the leaves; basal lobes of the leaves rather long and often acutish; spathe convolute throughout, wavy on the margin, mostly green, 4 – 7′ long; sterile portion of the spadix several times longer than the pistillate; ovules several; fruit green; seeds 1 – 3. (P. Virginica, *Kunth*, and most authors.) — Shallow water, New Eng. to Fla., west to Mich. and Ind. June.

2. **P. álba,** Raf. Rootstock tuberous, covered with thick-fleshy roots and propagating by offshoots; lobes of the leaves mostly short and broad, obtuse; spathe 3 – 4′ long, the blade broader, acuminate, somewhat expanded, white; sterile part of the spadix scarcely longer than the pistillate; ovules and seeds solitary; berry scarlet, 5 – 6″ long. (P. Virginica, *Schott*. Xanthosoma sagittifolia, *Chapm.*, not *Schott*. Caladium glaucum, *Ell.* Arum Virginicum, *L.*, in part?) — Marshes, S. Va. (?) and N. C. to Fla.

### 3. CÁLLA, L. WATER ARUM.

Spathe open and spreading, ovate (abruptly pointed, the upper surface white), persistent. Spadix oblong, entirely covered with flowers; the lower perfect and 6-androus; the upper often of stamens only. Floral envelopes none. Filaments slender; anthers 2-celled, opening lengthwise. Ovary 1-celled, with 5 – 9 erect anatropous ovules; stigma almost sessile. Berries (red) distinct, few-seeded. Seeds with a conspicuous rhaphe and an embryo nearly the length of the hard albumen. — A low perennial herb, growing in cold bogs, with a long creeping rootstock, bearing heart-shaped long-petioled leaves, and solitary scapes. (An ancient name, of unknown meaning.)

1. **C. palústris,** L. — Cold bogs, N. Scotia to N. J., west to Mich. and Minn., and northward. June. — Seeds surrounded with jelly. (Eu.)

### 4. SYMPLOCÁRPUS, Salisb. SKUNK CABBAGE.

Spathe hooded-shell-form, pointed, very thick and fleshy, decaying in fruit. Spadix globular, short-stalked, entirely and densely covered with perfect flowers, their 1-celled or abortively 2-celled ovaries immersed in the fleshy receptacle. Sepals 4, hooded. Stamens 4, opposite the sepals, with at length rather slender filaments; anthers extrorse, 2-celled, opening lengthwise. Style 4-angled and awl-shaped; stigma small. Ovule solitary, suspended, anatropous. Fruit a globular or oval mass, composed of the enlarged and spongy spadix, enclosing the spherical seeds just beneath the surface, which is roughened with the persistent fleshy sepals and pyramidal styles. Seeds filled by the large globular and fleshy corm-like embryo, which bears one or several plumules at the end next the base of the ovary; albumen none. — Perennial herb, with a strong odor like that of the skunk, and also somewhat alliaceous; a very thick rootstock, bearing a multitude of long and coarse fibrous roots, and a cluster of very large and broad entire veiny leaves, preceded in earliest spring by the nearly sessile spathes, which barely rise out of the ground. (Name from *συμπλοκή*, *connection*, and *καρπός*, *fruit*, in allusion to the coalescence of the ovaries into a compound fruit.)

1. **S. fœ̀tidus,** Salisb. Leaves ovate, cordate, becoming 1 – 2° long, short-petioled; spathe spotted and striped with purple and yellowish-green, ovate, incurved; fruit (in autumn) 2 – 3′ in diam., in decay shedding the bulblet-like seeds, which are 4 – 6″ long. — Bogs and moist grounds, N. Scotia to N. C., west to Minn. and Iowa.

### 5. ORÓNTIUM, L. Golden-club.

Spathe incomplete and distant, merely a leaf-sheath investing the lower part of the slender scape, and bearing a small and imperfect bract-like blade. Flowers crowded all over the narrow spadix, perfect; the lower with 6 concave sepals and 6 stamens; the upper ones with 4. Filaments flattened; anthers 2-celled, opening obliquely lengthwise. Ovary 1-celled, with an anatropous ovule; stigma sessile, entire. Fruit a green utricle. Seed without albumen. Embryo thick and fleshy, "with a large concealed cavity at the summit, the plumule curved in a groove on the outside." (*Torr.*) — An aquatic perennial, with a deep rootstock, long-petioled and entire oblong and nerved floating leaves, and the spadix terminating the elongated scape; its rather club-shaped emersed apex as thick as the spadix. (Origin of the name obscure.)

1. **O. aquáticum,** L. — Ponds, Mass. to Fla. May.

### 6. ÁCORUS, L. Sweet Flag. Calamus.

Spadix cylindrical, lateral, sessile, emerging from the side of a simple 2-edged scape which resembles the leaves, densely covered with perfect flowers. Sepals 6, concave. Stamens 6; filaments linear; anthers kidney-shaped, 1-celled, opening across. Ovary 2 – 3-celled, with several pendulous orthotropous ovules in each cell; stigma minute. Fruit at length dry, gelatinous inside, 1 – few-seeded. Embryo in the axis of albumen. — Pungent aromatic plants, especially the thick creeping rootstocks (*calamus* of the shops), which send up 2-edged sword-like leaves, and scapes somewhat like them, bearing the spadix on one edge; the upper and more foliaceous prolongation sometimes considered as a kind of open spathe. (Ἄκορας, the ancient name, of no known meaning.)

1. **A. Cálamus,** L. Scape leaf-like and prolonged far beyond the (yellowish-green) spadix. — Margins of rivulets, swamps, etc., N. Scotia to Fla., west to Minn., Iowa, and E. Kan.

## Order 124. LEMNÀCEÆ. (Duckweed Family.)

*Minute stemless plants, floating free on the water, destitute of distinct stem and foliage, being merely a frond, producing one or few monœcious flowers from the edge or upper surface, and commonly hanging roots from underneath; ovules rising from the base of the cell. Fruit a* 1 – 7*-seeded utricle. Seed large; the apex or radicular extremity of the seed-coat separable as an operculum or lid* (as in Cabomba, etc.). *Embryo straight, surrounded by fleshy or sometimes very scanty albumen.* — The simplest, and some of them the smallest of flowering plants, propagating by the proliferous growth of a new individual from a cleft in the edge or base of the parent frond, remaining connected for some time or separating, also by autumnal fronds in the form of minute bulblets, which sink to the bottom of the water, but rise and vegetate in spring; the flowers (in summer) and fruit scarce, in some species hardly ever seen. Frond more or less cavernous; the upper surface furnished with stomata. — These plants may be regarded as very simplified Araceæ.

1. **Spirodela.** Frond 7 - 11-nerved, with several rootlets.
2. **Lemna.** Frond 1 - 5-nerved, with a single rootlet.
3. **Wolffia.** Frond thick, very minute (¼ - ⅔″ broad), without rootlets.

## 1. SPIRODÈLA, Schleiden.

Anther-cells bilocellate by a vertical partition and longitudinally dehiscent. Ovules 2. Frond 7 - 11-nerved or more; rootlets several, with axile vascular tissue. Otherwise as Lemna. (From σπεῖρα, *a cord*, and δῆλος, *evident.*)

1. **S. polyrrhìza,** Schleid. Fronds round-obovate (2 - 4″ long), thick, purple and rather convex beneath, dark green above, palmately (mostly 7-) nerved. (Lemna polyrrhiza, *L.*) — Very common in ponds and pools, throughout N. Am., but very rarely found in flower or fruit. (Eu.)

## 2. LÉMNA, L. DUCKWEED. DUCK'S-MEAT.

Flowers produced from a cleft in the margin of the frond, usually three together surrounded by a spathe; two of them staminate, consisting of a stamen only; the other pistillate, of a simple pistil; the whole therefore imitating a single diandrous flower. *Ster. Fl.* Filament slender; anther 2- celled, didymous; the cells dehiscent transversely; pollen-grains large, spherical, muricate. *Fert. Fl.* Ovary 1-celled; style and truncate or funnel-shaped stigma simple. Ovules and seeds 1 - 7. — Fronds 1 - 5-nerved, producing a single rootlet beneath (which is destitute of vascular tissue), proliferous from a cleft in the margin toward the base, and at length stipitate; the tissue abounding with bundles of rhaphides. (An old Greek name of uncertain meaning.)

* *Ovule solitary, orthotropous or nearly so; frond* 1 - 3-*nerved, thin.*

+- *Fronds oblong, stalked at base, remaining connected.*

1. **L. trisúlca,** L. Fronds oblong to oblong-lanceolate (6 - 9″ long), attenuate at base into a slender stalk, denticulate at the tip, very obscurely 3-nerved, often without rootlets, usually several series of offshoots remaining connected; spathe sac-like; seeds ovate, amphitropous, with small round operculum. — Ponds and springy places, N. Scotia to N. J., west to the Pacific. (Eu.)

+- +- *Fronds oblong to elliptical or round-ovate, sessile, soon separating.*

2. **L. Valdiviàna,** Philippi. *Fronds elliptic-oblong,* small (about 1″ long), rather thick, usually somewhat falcate, *obscurely* 1-*nerved; spathe broad-reniform;* utricle long-ovate, pointed by the long style; *seed orthotropous,* oblong, *with a prominent acute operculum.* (L. Torreyi, *Austin.*) — Pools, N. J. and southward, westward across the continent. (S. Am.)

3. **L. perpusílla,** Torr. *Fronds obovate or roundish-obovate,* oblique (1 - 1½″ long), *obscurely* 3-*nerved;* utricle ovate; style rather long; *seed orthotro-*

*pous*, ovate or oval, obtuse, *with scarcely apiculate operculum.* — N. Y. and N. J., west to Mich. and Wisc. — Var. TRINÉRVIS, Austin, has larger, distinctly 3-nerved fronds, and an unequally cordate seed.

4. **L. minor,** L. *Fronds round- to elliptic-obovate* (1 – 2½″ in diameter), rather thick, *very obscurely 3-nerved ; spathe sac-like ;* utricle short-urn-shaped, tipped with a short style ; seed oblong-obovate, *amphitropous, with prominent rounded operculum.* — Stagnant waters, throughout N. Am. (Eu.)

* * *Ovules 2 – 7, anatropous ; fronds very thick and spongy, flat above, very obscurely 5-nerved (1½ – 3″ long).*

5. **L. gibba,** L. Fronds obovate-elliptic to nearly orbicular, almost hemispherical, soon separating ; bract sac-like. — Mo. (?) to Ariz. and Calif.

### 3. WÓLFFIA, Horkel.

Flowers central, bursting through the upper surface of the globular (or in some foreign ones flat) and loosely cellular frond, only 2 ; one consisting of a single stamen with a 1-celled 2-valved anther ; the other of a globular ovary, tipped with a very short style and a depressed stigma. Ovule orthotropous, rather oblique in the cell. Utricle spherical. Albumen thin. — Fronds rootless, proliferous from a cleft or funnel-shaped opening at the base, the offspring soon detached ; no rhaphides. — The simplest and smallest of flowering plants, from ¼ – ⅔″ long (an African and Cuban species much larger), floating as little grains on the water. (Named for *John Fred. Wolff*, who wrote on Lemna in 1801.)

1. **W. Columbiàna,** Karsten. Globose or globular, ⅓ – ⅔″ long, very loosely cellular, light green all over, not dotted ; stomata 1 – 6 ; the opening at the base circular and with a thin border. — Floating rather beneath the surface of stagnant waters, Conn. to N. J., west to Minn. and La.

2. **W. Brasiliénsis,** Weddell. Oblong, smaller and more densely cellular, flattish and deep green with many stomata above, tumid and pale below, brown-dotted all over, anterior edge sharp, opening at base circular. — Growing with the last, but floating on the surface.

## ORDER 125. ALISMÀCEÆ. (WATER-PLANTAIN FAMILY.)

*Marsh herbs, with scape-like stems, sheathing leaves, and perfect or monœcious or diœcious flowers ; perianth of 3 herbaceous persistent sepals and as many (often conspicuous) white deciduous petals, which are imbricate or involute in bud ; stamens 6 or more, included ; ovaries numerous, distinct, 1-celled and mostly 1-ovuled, becoming achenes in fruit* (in our genera) ; *seeds erect ; campylotropous.* — Roots fibrous ; leaves radical, petiolate and strongly nerved with transverse veinlets, the earlier sometimes without blade ; flowers long-pedicellate, mostly verticillate, in a loose raceme or panicle, with lanceolate scarious bracts slightly connate at base.

1. **Alisma.** Flowers perfect, usually 6-androus. Carpels flattened, in one whorl.
2. **Sagittaria.** Flowers mostly unisexual. Stamens rarely few. Carpels flattened, in dense heads, winged.
3. **Echinodorus.** Flowers perfect. Stamens 6 or more. Carpels capitate, turgid and ribbed, often beaked.

### 1. ALÍSMA, L. Water-Plantain.

Flowers perfect. Petals involute in the bud. Stamens definite, mostly 6. Ovaries many in a simple circle on a flattened receptacle, forming flattened coriaceous achenes, which are dilated and 2-3-keeled on the back. — Roots fibrous. Leaves all from the root, several-ribbed, with connected veinlets. Scape with whorled panicled branches. Flowers small, white or pale rose-color. (The Greek name; of uncertain derivation.)

1. **A. Plantàgo,** L. Perennial by a stout proliferous corm; leaves long-petioled, ovate, oblong, or lanceolate or even linear, acute, mostly rounded or heart-shaped at base, 3-9-nerved; panicle loose, compound, many-flowered (1-2° long); carpels obliquely obovate, forming an obtusely triangular whorl in fruit. — Shallow water and ditches, across the continent. Very variable as to foliage, but the leaves usually more broadly cordate-ovate than in Old World forms (var. Americànum, *R. & S.*); when growing under water thinner and narrowly lanceolate. (Eu., etc.)

### 2. SAGITTÀRIA, L. Arrow-head.

Flowers monœcious, or often diœcious in n. 1 and 4, and polygamous in n. 7. Petals imbricated in the bud. Stamens indefinite, rarely few. Ovaries many, crowded in a spherical or somewhat triangular depressed head on a globular receptacle, in fruit forming flat membranaceous winged achenes. — Marsh or aquatic, mostly perennial, stoloniferous herbs, with milky juice and fibrous roots; the scapes sheathed at base by the bases of the long cellular petioles, of which the primary ones, and sometimes all, are flattened, nerved, and destitute of any proper blade (i. e. are phyllodia); when present the blade is arrow-shaped or lanceolate, nerved and with cross-veinlets as in Alisma. Flowers produced all summer, whorled in threes, with membranous bracts; the sterile above. (Name from *sagitta*, an arrow, from the prevalent form of the leaves.)

§ 1. SAGITTARIA proper. *Flowers monœcious, with the lower whorls pistillate, or diœcious; stamens few or numerous, covering the receptacle; sepals spreading or reflexed in fruit.*

* *Filaments numerous, narrow, as long as or longer than the linear-oblong anthers: bracts 3, distinct; fruiting heads larger.*

1. **S. variábilis,** Engelm. Scape ($\frac{1}{4}$-4° high) angled, with one or more of the lower whorls fertile; leaves very various, almost always sagittate; bracts mostly pointed; pedicels of the fertile flowers at least half the length of the sterile ones; petals wholly white; filaments glabrous, nearly twice the length of the anthers; achenes obovate (about 1″ long), winged on both margins, with a long curved or usually horizontal beak $\frac{1}{4}$-$\frac{1}{3}$ its length. (S. sagittæfolia, *L.*, var. variabilis, *M. Micheli.*) — In water or wet places, very common; exceedingly variable in size and foliage, ordinarily with narrow halberd-shaped or sagittate leaves, — sometimes diœcious, with large, broad and obtuse leaves (var. OBTÙSA), or monœcious, with large, broad and acute leaves (var. LATIFÒLIA), or the narrow leaves with long and linear diverging lobes (var. ANGUSTIFÒLIA), or with some leaves lanceolate or ovate-lanceolate, others more or less sagittate (var. DIVERSIFÒLIA), etc. Root propagating by stolons tuberiferous at the extremity. — The European species has the fertile pedicels only

⅓ or ¼ the length of the sterile; claws of the petals purple-tinged; filaments not longer than the anthers; and achenes almost orbicular, very broadly winged and with a short straight beak.

Var. **pubéscens,** Engelm. Upper part of petiole and scape and especially the orbicular-ovate obtuse bracts and sepals pubescent or woolly; beak of fruit horizontal. — N. J. and Penn. to Ga.

Var. (?) **grácilis,** Engelm. Lobes of the sagittate leaves very narrowly linear (½ – 2″ wide); achene narrowly cuneate-obovate (2″ long), the beak long, stout, and strongly recurved, the sides usually strongly 1 – 3-crested. (S. cristata, *Engelm.*?) — Mass. to western N. Y.; Iowa.

2. **S. lancifòlia,** L. Scape 2 – 5° high, with several of the lower whorls fertile; leaves lanceolate or lance-oblong, rarely linear, all with a tapering base, thick or coriaceous (6 – 18′ long and on a long and stout petiole, never sagittate), the nerves mostly arising from the very thick midrib; bracts ovate, acute or acuminate; pedicels slender, the fertile scarcely shorter than the sterile ones; filaments pubescent; achenes falcate, winged on the back, pointed with an incurved beak. — Swamps, Md. to Ky., Mo., and southward. (W. Ind.)

* * *Filaments very short, with enlarged mostly glandular base; anthers ovate or short-oblong; fruiting heads small; bracts more or less connate; leaves very rarely sagittate.*

3. **S. heterophýlla,** Pursh. Scape weak (3′ – 2° high), at length procumbent; leaves lanceolate or lance-oval, entire, or with one or two narrow basal sagittate appendages; *bracts roundish, obtuse;* flowers of the lowest whorl fertile and *almost sessile;* the sterile on long pedicels; filaments glandular-pubescent; *achenes narrowly obovate with a long erect beak.* — N. Eng. to Fla., west to Minn. and Mo. Varies as to foliage, the leaves being broad (var. ELLÍPTICA, Engelm.), or rigid and narrowly lanceolate with stout petioles (var. RÍGIDA, Engelm.), or nearly linear (var. ANGUSTIFÒLIA, Engelm.)

4. **S. gramínea,** Michx. Scape 3′ – 2° high; *phyllodia flat,* mostly *broadly linear, acuminate;* leaves ovate-lanceolate to linear, on long slender petioles, sometimes reduced to the petiole merely; bracts rather obtuse; whorls of flowers often few, all staminate or the lower fertile; *pedicels* slender, *spreading,* nearly equal; *filaments* 15 – 20, *glandular-pubescent; achene small* (½″ long), narrowly obovate, almost beakless, *winged on the back, flat and scarcely costate on the sides.* — N. Eng. to Minn., south to the Gulf; very variable.

5. **S. tères,** Watson. *Phyllodia terete, very acutely attenuate* upward, 3 – 12′ long, very rarely bearing a narrow blade; scape ½ – 1½° high; bracts connate at base; *pedicels* in 1 – 3 whorls, all very *slender and spreading,* 1 or 2 fruiting, ½ – 1′ long; filaments 12, dilated, pubescent; *achene* obovate, 1″ *long, with an erect beak,* the margins and sides *crenately several-crested.* — In shallow water, S. New Eng. to N. J. (Hyannis, Mass., *Deane;* Wading River, L. I., *Miller;* barrens of N. J., *Torrey.*) Phyllodia usually very strongly nodose.

6. **S. nàtans,** Michx., var. **loràta,** Chapm. Usually dwarf; *leaves linear, strap-shaped, obtuse or acutish,* 1 – 6′ long, equalling or shorter than the scape, very rarely with a narrow blade; pedicels in 1 – 3 whorls, only 1 or 2 fruiting, *stouter and recurved;* bracts connate or spathe-like; *filaments* 6 – 8, *glabrous; achene* obovate, *short-beaked,* 1″ *long,* the margins and sides *crenately*

*crested.* (S. pusilla, *Pursh.*) — In mud or shallow water, near the coast; N. Y. to Fla.

Var. (?) **gracíllima,** Watson. Scape and the almost or wholly bladeless leaves very slender and greatly elongated (2–4° long, 1″ wide); pedicels all elongated, in usually distant whorls, the lower pistillate, slender and spreading; fruit unknown. (S. natans, *Engelm.* in Torr. Bull. ix. 4.) — In deep water of streams in E. Mass. (*Hitchings, Boott, C. E. Faxon,* etc.) Wholly submerged, only 1 or 2 flowers appearing at a time, floating on the surface. The fruit, maturing under water, has not yet been collected.

§ 2. LOPHIOCÁRPUS. *Fertile flowers perfect; stamens* 9–15, *at the base of the receptacle; sepals erect and embracing the fruit.*

7. **S. calycìna,** Engelm. Scape weak (3–9′ high), at length mostly procumbent; usually only the lowest whorl fertile, with pedicels as long as those of the sterile flowers, recurved in fruit; bracts orbicular, obtuse or rarely pointed; filaments slightly rough, as long as the anthers; achenes obovate with a short horizontal style; leaves broadly halberd-shaped, obtuse or acutish, with wide spreading lobes, often wider than long, or lanceolate or sometimes reduced to linear phyllodia. — Maine to Del., west to Wisc., Mo., and Tex. Quite variable, several forms being enumerated, as var. SPONGIÒSA, with spongy texture and bladeless submerged leaves, eastward; and westward, var. FLÙITANS, with lance-linear floating leaves.

## 3. ECHINÓDORUS, Richard.

Flowers perfect. Petals imbricated in the bud. Stamens 6–21 or more. Ovaries several or many, imbricated in a head, forming thick and ribbed achenes in fruit, often beaked with a projecting persistent style. — Mostly annuals, with the habit of Sagittaria, the naked stems sparingly branched or simple, and the flowers on rather short pedicels, in whorls of 3–6 or more. Fl. summer and autumn. (Name from ἐχινώδης, *prickly,* or from ἐχῖνος, and δορός, *a leathern bottle,* applied to the ovary, which is in most species armed with the persistent style, so as to form a sort of prickly head of fruit.)

1. **E. párvulus,** Engelm. Scapes 1–3′ high; shoots often creeping and proliferous; *leaves lanceolate or spatulate, acute* (½–1½′ long, including the petiole); umbel single, 2–8-flowered; pedicels reflexed in fruit; flower 3″ broad; *stamens* 9; *styles much shorter than the ovary; achenes beakless,* obtusely few-ribbed. — In mud, Mass. to Mich. and E. Minn., south to Fla. and Tex. (S. Am.)

2. **E. rostràtus,** Engelm. *Scape erect,* 3′–2° high, longer than the leaves; *leaves broadly ovate, cordate or truncate at base, obtuse* (the blade 1–3′ long); umbel proliferous, in a branched panicle; flower 5″ broad; *stamens* 12; *styles longer than the ovary; achenes beaked,* acutely many-ribbed. — Swamps and ditches, Ill to Fla., Mo., and Tex. — A low form (var. LANCEOLÀTUS, Engelm.) has the leaves lanceolate with an acute base. Ill., Mo.

3. **E. radìcans,** Engelm. *Stems or scape prostrate, creeping* (2–4° long), proliferous, bearing many whorls of flowers; leaves somewhat truncately broadly heart-shaped, obtuse (2–8′ broad), long-petioled; flowers 6–9″ broad; *stamens about* 21; *styles shorter than the ovary; achenes short-beaked,* the keeled back denticulate. — Swamps, Ill. to N. C. and Fla., west to Mo. and Tex.

## ORDER 126. NAIADÀCEÆ. (PONDWEED FAMILY.)

*Marsh or mostly immersed aquatic herbs, with stems jointed and leafy or* (in Triglochin) *naked and scape-like, leaves sheathing at base or stipulate, and flowers perfect or unisexual, often spathaceous, with perianth of* 4 *or* 6 *herbaceous distinct valvate segments, or membranous and tubular or cup-shaped, or none.* Stamens 1, 2, 4 or 6, with extrorse anthers. Ovaries 1 – 6, distinct or more or less coherent, 1-celled, usually 1-ovuled, in fruit follicular or capsular or an indehiscent berry or utricle.

SUBORDER I. **Juncagineæ.** Marsh plants, with terete bladeless leaves; flowers perfect, spicate or racemose, with herbaceous 6- (rarely 3-) lobed perianth; carpels 3 or 6, more or less united, separating at maturity. Seeds anatropous; embryo straight.

1. **Triglochin.** Ovaries 3 – 6, united until maturity. Leaves radical. Flowers bractless, in a spike-like raceme terminating a jointless scape.
2. **Scheuchzeria.** Ovaries 3, nearly distinct, at length divergent. Flowers bracteate in a loose raceme upon a leafy stem.

SUBORDER II. **Naiadeæ.** Immersed aquatics, with flat leaves; ovaries solitary or distinct, 1-ovuled.

+ Flowers perfect, spiked or clustered; anthers 4 or 2, sessile; leaves alternate.

3. **Potamogeton.** Spike peduncled. Sepals 4, herbaceous. Anthers 4. Ovaries 4, sessile.
4. **Ruppia.** Flowers on an enclosed spadix, at length long-exserted, without perianth. Anther-cells 4, distinct. Ovaries 4, becoming stipitate.

+ + Flowers monœcious or diœcious, axillary, naked, monandrous; leaves opposite (alternate in n. 6).

5. **Zannichellia.** Monœcious. Pistils (2 – 5) from a cup-shaped involucre or sheath.
6. **Zostera.** Pistils and stamens alternate in 2 vertical rows on the inner side of a leaf-like enclosed spadix. Stigmas 2, linear. Stem creeping.
7. **Naias.** Diœcious; pistil solitary, naked. Stamen enclosed in a membranous spathe. Stems floating, with opposite or ternate leaves.

### 1. TRIGLÒCHIN, L. ARROW-GRASS.

Sepals and petals nearly alike (greenish), ovate, concave, deciduous. Stamens 3 – 6; anthers oval, on very short filaments. Pistils united into a 3 – 6-celled compound ovary; stigmas sessile; ovules solitary. Capsule splitting when ripe into 3 – 6 carpels, which separate from a persistent central axis. — Perennials, with rush-like, fleshy leaves, below sheathing the base of the wand-like naked and jointless scape. Flowers small, in a spiked raceme, bractless. (Name composed of τρεῖς, *three*, and γλωχίν, *point*, from the three points of the ripe fruit in n. 1 when dehiscent.)

* *Fruit of* 3 *carpels.*

1. **T. palústris,** L. Scape (6 – 18′ high) and leaves slender; *sepals and stamens* 6; *fruit linear-club-shaped; carpels* when ripe separating from below upward, leaving a triangular axis, *awl-pointed at base.* — Marshes, western N. Y. to Ill., Minn., and westward. Aug. (Eu., Asia, etc.)

2. **T. striàta,** Ruiz & Pav. Scape (6 – 12′ high) and leaves slender; flowers very small; *sepals and stamens* 3; *fruit globose-triangular*, or when dry 3-lobed. (T. triandra, *Michx.*) — Sea-shore, Md. to Fla. (S. Am., etc.)

* * *Fruit of* 6 *carpels* (*rarely* 5).

3. **T. marítima,** L. Scape (1–3° high) and leaves thickish, fleshy; fruit ovate or oblong, acutish; carpels rounded at base and slightly grooved on the back, the edges acute. — Salt-marshes along the coast, Lab. to N. J., and in saline, boggy or wet places across the continent. (Eu., Asia, etc.)

## 2. SCHEUCHZÈRIA, L.

Sepals and petals oblong, spreading, nearly alike (greenish-yellow), but the latter narrower, persistent. Stamens 6; anthers linear. Ovaries 3, globular, slightly united at base, 2–3-ovuled, bearing flat sessile stigmas, in fruit forming 3 diverging and inflated 1–2-seeded pods, opening along the inside. — A low bog-herb, with a creeping jointed rootstock, tapering into the ascending simple stem, which is zigzag, partly sheathed by the bases of the grass-like conduplicate leaves, and terminated by a loose raceme of a few flowers, with sheathing bracts; leaves tubular at the apex. (Named for *John* and *John Jacob Scheuchzer*, distinguished Swiss botanists early in the 18th century.)

1. **S. palústris,** L. — Peat-bogs, N. Brunswick to N. J., westward across the continent. June. (Eu., Asia.)

## 3. POTAMOGÈTON, Tourn. PONDWEED.

Flowers perfect. Sepals 4, rounded, valvate in the bud. Stamens 4, opposite the sepals; anthers nearly sessile, 2-celled. Ovaries 4 (rarely only one), with an ascending campylotropous ovule; stigma sessile or on a short style. Fruit drupe-like when fresh, more or less compressed; endocarp (*nutlet*) crustaceous. Embryo hooked, annular, or cochleate, the radicular end pointing downward. — Herbs of fresh, or one in brackish, ponds and streams, with jointed mostly rooting stems, and 2-ranked leaves, which are usually alternate or imperfectly opposite; the submersed ones pellucid, the floating ones often dilated and of a firmer texture. Stipules membranous, more or less united and sheathing. Spikes sheathed by the stipules in the bud, mostly raised on a peduncle to the surface of the water. (An ancient name, composed of *ποταμός, a river,* and *γείτων, a neighbor,* from the place of growth.) — By *fruit,* the full-grown fresh or macerated fruit is intended; by *nutlet,* that with the fleshy outer portion or epicarp removed. All except n. 19 flower in summer; the month mentioned indicates the time of ripening of the fruit.

§ 1. *Leaves of two sorts; floating ones more or less coriaceous, with a dilated petioled blade, different in form from the thinner submersed ones.*

* *Submersed leaves reduced to narrowly grass-like or filiform sessile phyllodia.*

+– *Stems rather stout; stipules free; spikes all emersed, cylindrical and densely fruited; fruits fleshy and turgid, obliquely obovate.*

1. **P. nàtans,** L. *Stem simple or sparingly branched;* floating leaves all long-petioled, elliptical or ovate, somewhat cordate at base, obtuse but with a blunt point, 21–29-nerved; upper submersed leaves lanceolate, early perishing, the lower (later in the season) very slender (3–7′ long, barely 1″ wide); upper *stipules very long, acute; peduncle about the thickness of the stem;* spikes 1–2′ long; sides of the turgid *nutlet with a small deep impression in the middle;*

embryo coiled into an incomplete elliptical ring. — Ponds and ditches, N. Scotia to Va., westward across the continent. In deeper or flowing water the plant becomes more slender and often wholly submersed (var. PROLÍXUS, *Koch*). — Aug., Sept. (Eu., Asia.)

2. **P. Oakesiànus,** Robbins. Stem more slender, *much branched;* floating leaves smaller (1 – 1½′ long), ovate- or oblong-elliptical, obtuse, fewer- (17 – 23-) nerved; lowest submersed ones almost capillary (only ¼ – ½″ wide), continuing through the flowering season; spikes shorter (¾ – 1′ long), on *peduncles much thicker than the stem;* fruit smaller and more acute; *sides of the turgid nutlet not at all impressed;* curvature of the embryo nearly circular, its apex directed to a point above its base. — Ponds, and especially pools and stagnant ditches, Mass. to N. J.; also Anticosti. Aug.

3. **P. Pennsylvánicus,** Cham. *Stems compressed,* often simple from the creeping rootstocks; floating leaves chiefly opposite (1 – 3½′ long), 11 – 17-nerved, oblong, tapering into a *short petiole,* the lower gradually narrowing and passing into the submersed ones, which are very numerous and approximate, 2-ranked, linear (2 – 5′ long, and 1 – 2½″ wide), 5 – 7-nerved, the lateral nerves slender and nearly marginal, the space within the inner nerves *coarsely cellular-reticulated; stipules very obtuse;* spikes numerous, about the length of the thickened peduncle; *fruit round-obovate,* flattish, 3-keeled when dry; *nutlet distinctly impressed on the sides;* curvature of the embryo transversely oval. (P. Claytonii, *Tuckerm.*) — Still or flowing water, N. Brunswick to S. C., west to N. Ind. and Minn. July, Aug.

+ + *Like the preceding section, but all the parts small, slender and delicate, only the fertile plants producing floating leaves; spikes very small and few-flowered; propagated by autumn buds.*

4. **P. Vasèyi,** Robbins. Very delicate; stem almost capillary; *floating leaves obovate* (3 – 5″ long) and about the length of their filiform petioles, with 5 nerves deeply impressed beneath, cross-veins distinct; submersed leaves filiform-linear, very attenuate (1 – 2′ long, ⅛ – ¼″ wide) and acute; *stipules* not adnate, scarious, *long,* acute; spikes all emersed, few, interrupted-oblong, 3 – 5-flowered, on a thickish peduncle; fruit oblique, round-obovate (⅔″ long), compressed, slightly sharp-margined, tipped with a distinct recurved style, the sides impressed and face acute; upper portion of the embryo circularly incurved, its apex transverse to the fruit. — Canada and N. Eng.; also Ill. The fruiting form, with floating leaves, rare; the submerged form apparently much more abundant.

5. **P. lateràlis,** Morong. Stem filiform, branching; *floating leaves elliptical* (4 – 6″ long by 2″ wide), with 5 – 7 nerves deeply impressed beneath, tapering at base into a somewhat dilated petiole shorter than the blade; *submersed leaves linear,* acute (1 – 3′ long by ¼ – ½″ wide), 1 – 3-nerved. the mid-nerve with fine veins or cellular reticulations on each side, bi-glandular at base; *stipules short; peduncles with a very peculiar lateral appearance,* widely spreading at maturity, sometimes even recurved, often thicker than the stem; spikes often interrupted (2 – 4-flowered); fruit obliquely obovate (hardly 1″ long), the back much curved, with two fine grooves upon it; embryo oval in its curve, the apex nearly touching the base. — Mass and Mich.; rare. Undeveloped specimens resemble P. pusillus.

+- +- +- *Stems slender or filiform, much branched; floating leaves sometimes wanting; stipules adnate to the base of the leaf; spikes of two kinds, one emersed, cylindrical and many-flowered, on a club-shaped peduncle, the other submersed, globular and few-flowered; fruit flat, cochleate, with thin or scarcely any flesh and a thin nutlet; embryo spiral.*

6. **P. Spiríllus,** Tuckerm. Floating leaves oval to lance-oblong and lanceolate (the largest 10″ long, 4″ wide), usually obtuse, about equalling the *rather dilated petioles*, with 5 – many nerves beneath deeply impressed; upper submersed leaves either with or without a lance-oblong or broad-linear proper blade; the numerous lower ones narrow-linear, tapering toward the obtuse apex (¾ – 1½′ long, ¼ – ⅔″ wide); stipules early lacerate; *submersed flowers usually solitary on very short erect peduncles; fruit* with the back either *winged and with* 4 – 5 *distinct teeth or wingless and entire; embryo coiled* 1¾ *turns.* — Rivers, and even far up small streams, N. Eng. to Va., west to Mich. and Mo. June – Aug. — Stem less slender than in the next.

7. **P. hýbridus,** Michx. Floating leaves oval to lance-oblong (the largest 10″ long, 6″ wide), often acute, longer than the *filiform petioles*, with about 5 – 7 nerves beneath deeply impressed; submersed leaves very numerous, almost setaceous (1 – 3′ long, very rarely ½″ wide); stipules obtuse; emersed spikes 4 – 7″ long; *submersed* spikes 1 – 4-flowered, their *peduncles* (of their own length) *frequently recurved; fruit minute, about* 8-*toothed on the margin; embryo coiled* 1½ *turns.* — Shallow stagnant waters, N. Brunswick to Fla., west to Mich., Mo., and N. Mex. June – Aug.

* * *Submersed leaves lanceolate, rarely oval or linear, membranaceous; spikes dense, many-flowered, on stout peduncles.*

8. **P. ruféscens,** Schrad. Stem simple; floating leaves (often wanting) 2 – 5′ long, rather thin, *wedge-oblanceolate, narrowed into a short petiole*, 11 – 17-nerved; *submersed leaves almost sessile*, lanceolate and lance-oblong, smooth on the margin, fewer-nerved; stipules broad, hyaline, obtuse, upper ones acuminate; spike 1 – 2′ long, often somewhat compound; fruit obovate, lenticular, pitted when immature, with an acute margin and pointed with the rather long style; embryo incompletely annular. — In streams or ponds, N. Brunswick to N. J., west to Minn. and Tex. Aug., Sept. (Eu.)

9. **P. flùitans,** Roth. Stem often branching below; *floating leaves thinnish, lance-oblong or long-elliptical*, often acute, *long-petioled*, 17 – 23-nerved; *submersed leaves very long* (3 – 12′, by 2 – 12″ wide), *lanceolate and lance-linear*, 7 – 15-nerved, coarsely reticulated; peduncles somewhat thickened upward; fruit obliquely obovate, obscurely 3-keeled when fresh, and distinctly so when dry, the middle one winged above and sometimes with 3 – 5 shallow indentations; the rounded slightly curved face surmounted by the short style; nutlet with the sides scarcely impressed; upper part of the embryo circularly incurved. (P. lonchites, *Tuckerm.*) — In streams or rarely in ponds, N. Brunswick to N. J., west to Minn. and Iowa. Aug., Sept. (Eu.)

10. **P. púlcher,** Tuckerm. Stem simple, black-spotted; *leaves of three kinds;* floating ones becoming very large (4½ by 3½′), *roundish-ovate and cordate or ovate-oblong*, 25 – 37-nerved, *all alternate; upper submersed ones* (3 – 5) *usually lanceolate*, acute at base and very long-acuminate, 10 – 15-nerved, very thin, cellular each side of the midrib, undulate, short-petioled; *lowest* (2 – 4

near the base of the stem) *thicker, plane, oval or oblong* with a rounded base, or spatulate-oblong, on longer petioles; stipules rather short and obtuse; peduncles thicker than the stem; fruit with a rounded back and angular face, pointed, distinctly 3-keeled when fresh, sharply so when dry; nutlet with two deep dorsal furrows, and a sinus below the angle in front; sides flat; embryo circularly much incurved above. — Ponds, Vt. to Ga. and Mo. July, Aug.

11. **P. amplifòlius,** Tuckerm. Stems simple, of very variable length; *floating leaves* (sometimes wanting) large, *oblong or lance-ovate*, sometimes slightly cordate at base, abruptly acutish, 30 – 50-nerved, on *rather long petioles;* submersed leaves often very large (reaching 7′ by 2′), lanceolate or oval, acute at each end, *usually much recurved, undulate*, mostly on short petioles; *stipules very long and tapering to a point*, soon becoming loose; peduncles thickened upward, in deep water much elongated; fruit very large (over 2″ long), rather obliquely obovate, 3-keeled, with a broad stout beak; nutlet slightly impressed on the sides; upper part of the embryo curved into a ring. — Ponds and rivers, N. Eng. to N. J., west to Minn. and Kan. Aug., Sept.

12. **P. Illinoénsis,** Morong. *Stem stout, branching* towards the summit; floating leaves opposite, oval or ovate (2 – 5′ long by 1½ – 2′ broad), 19 – 25-nerved, rounded or subcordate at base, with a short blunt point at apex, on short petioles; *submersed leaves rather few, oblong-elliptical*, acute at each end, *usually ample* (largest 8′ by 1½′); *stipules coarse, obtuse, strongly bicarinate* (2′ long); peduncles often clustered at the summit (2 – 4′ long), thickening upward; *fruit roundish-obovate* (1¾ – 2″ long), 3-keeled on the back, middle keel prominent; nutlet flattened and slightly impressed on the sides, obtuse or pointed at base; apex of embryo directed transversely inward. — Streams and ditches, western N. Y. to Ill., Iowa, and Minn. Very near the last.

13. **P. heterophýllus,** Schreb. *Stem slender, very branching* below; floating leaves mostly thin, variable, but with a short blunt point, 9 – 15-nerved, usually 1 – 2′ long and 6 – 9″ wide; submersed ones usually lanceolate or linear-lanceolate, acuminate or cuspidate, narrowed toward the base, about 7-nerved on the stem and 3-nerved on the branches; upper ones petioled, lower sessile; *stipules obtuse*, loose; peduncles somewhat thickened upward; fruit small, roundish, compressed, scarcely keeled; embryo annular above. (P. gramineus, *Fries.*) — Still or flowing water, common. Varies exceedingly in its submersed leaves, peduncles, etc.; the var. GRAMINIFÒLIUS (Fries), growing in rapid streams, with stems much elongated and less branched, and the flaccid submersed leaves 2 – 7′ long by 2 – 10″ wide.

Var. (?) **myriophýllus,** Robbins. Sending up from running rootstocks many short repeatedly dichotomous and densely leafy stems; fertile stems very slender; floating leaves small, delicate, lance-oblong, on long filiform petioles; submersed stem-leaves larger, early perishing; those of the branches (deep-green) linear-oblanceolate, very small (¾ – 1′ long), acute, sometimes minutely serrulate; spike slender, loosely-flowered, much shorter than the thickened peduncle. — Apponaug Pond, R. I., without fruit.

13ª. **P. Zízii,** Mert. & Koch. Resembling P. lucens, but smaller, much branched at base; *upper leaves coriaceous or subcoriaceous, long-petioled* and *sometimes emersed*, the others subsessile, all usually numerous, undulate and *shining;* peduncle elongated. (P. lucens, var. minor, *Nolte.* Also P. gramineus, var. (?) spathulæformis, *Robbins;* P. spathæformis, *Tuckerm.;* "P. varians, *Morong*.") — N. Eng to Fla., and westward. Connecting with the next section. (Eu )

§ 2. *Leaves all submersed and similar, mostly sessile, membranaceous and dilated, lanceolate, oblong, or oval; stipules obtuse, becoming loose.*

14. **P. lùcens,** L. Stem thick, branching, sometimes very large; *leaves more or less petioled,* oval or lanceolate, *mucronate,* often rough-serrulate, *frequently shining;* peduncles often elongated; *fruit* roundish and compressed, *with obtuse margins, slightly keeled;* embryo circularly incurved above. — Ponds, N. Eng. to Fla., west to the Pacific. Aug., Sept. (Eu.)

Var. (?) **Connecticuténsis,** Robbins. Stem flexuous; *leaves* all submersed, nearly sessile, lanceolate, *acuminate, crisped, not shining nor serrulate; fruit larger, distinctly keeled;* nutlet thick and hard. — Lake Saltonstall, East Haven, Conn.

15. **P. prælóngus,** Wulf. Stem very long, branching, flexuous; *leaves* lance-oblong or lanceolate (sometimes 7′ long), *half-clasping, obtuse with a boat-shaped cavity* at the extremity, thence splitting on pressure; stipules scarious, very obtuse; spikes rather loose-flowered; *peduncles very long* (sometimes reaching 20′); *fruit* obliquely obovate, compressed, *sharply keeled* when dry; style terminating the nearly straight face; curve of the embryo oval and longitudinal. — Ponds and large rivers, N. Scotia to Mass., west to Minn. and Iowa. Sept., Oct. — Stem white; foliage bright green. (Eu.)

16. **P. perfoliàtus,** L. Stem branching; *leaves orbicular, ovate or lanceolate from a cordate-clasping base,* usually obtuse and often minutely serrulate; peduncles short, cylindrical; *fruit* irregularly obovate, *obtusely margined;* embryo incurved in an oval. — Ponds and slow streams, common. N. Scotia to Fla., west to Minn. and Iowa. Sept., Oct. (Eu.)

Var. **lanceolàtus,** Robbins. Larger; *leaves long-lanceolate* from a cordate-clasping base and *acuminate,* wavy, 3 – 4½′ long; *peduncles thickened upward.* — Same range as the species, and extending west to the Pacific.

17. **P. críspus,** L. *Stem compressed; leaves linear-oblong,* half-clasping, obtuse, *serrulate, crisped-wavy,* 3-*nerved; fruit long-beaked;* upper portion of the embryo incurved in a large circle. — Flowing and stagnant waters, Mass. to N. J. and Va., west to western N. Y. June, July. (Eu.)

18. **P. Mýsticus,** Morong. *Stem very slender* and irregularly branching, nearly filiform (1 – 3° high); *leaves oblong-linear* (½ – 1½′ long by 2 - 3″ wide), 5 – 7-nerved, *finely undulate and entire, obtuse or bluntly pointed, abruptly narrowing at base, sessile or partly clasping;* spikes few, capitate (4 – 6-flowered), on erect peduncles (1 – 2′ long); fruit (immature) obovate, small (hardly ¾″ long), *obscurely 3-keeled on the back,* a little beaked by the slender recurved style. — Mystic Pond, Medford, Mass.

§ 3. *Leaves all submersed and similar, mostly membranaceous and sessile, linear or setaceous.*

* *Stipules free from the sheathing base of the leaf.*

19. **P. zosteræfòlius,** Schum. *Stem branching, wing-flattened; leaves* linear and grass-like (commonly 4′ by 1½″), *abruptly pointed, with many fine and 3 larger nerves;* stipules (seen young) oblong, very obtuse; *spikes cylindrical,* 12 – 15-flowered, *not half as long as the peduncle;* fruit obliquely obovate, somewhat keeled and with slight teeth on the back, the sides not impressed,

the face arching and terminated by the short style; *summit of the large embryo lying transverse to the fruit.* (P. compressus, *Fries;* not *L.?*) — Still and slow-flowing waters, N. Eng. to N. J., Iowa, and Minn. Aug., Sept. (Eu.)

20. **P. Hillii,** Morong. Stem slender, *widely branching, flattish;* leaves linear, *acute* (1 – 2½′ long by ½ – 1¼″ wide), 3-*nerved,* the lateral nerves delicate and near the margin; stipules whitish, striate, obtuse (3 – 5″ long); *spikes capitate* (3 – 6-fruited), *on short spreading or recurved peduncles;* fruit as in the last. — Mich. and western N. Y.

21. **P. obtusifòlius,** Mertens & Koch. *Stem flattened, very branching; leaves* linear, tapering toward the base, obtuse and mucronate or very acute, 3- (*rarely* 5-) *nerved; stipules elongated,* very obtuse; *spike ovate, continuous,* 5 – 8-flowered, *about the length of the peduncle;* fruit oval, apiculate with the style, not keeled when fresh, *upper portion of embryo* coiled inward and *lying transverse to the fruit.* — Slow streams and ponds, Canada and N. Eng. to western N. Y. and Mich. Sept., Oct. (Eu.)

22. **P. pauciflòrus,** Pursh. *Stem filiform, flattish and very branching; leaves narrowly linear* (1 – 2′ long and seldom ½″ wide), acute, *obscurely* 3-*nerved; stipules obtuse; spikes* capitate, 1 – 4- (*usually* 2-) *flowered,* on short club-shaped peduncles; *fruit roundish-lenticular;* the *back* more or less *crested;* upper portion of the embryo incurved in a circle. — Still or stagnant waters, N. Brunswick to Ga., Iowa, Minn., and westward.

Var. **Niagarénsis,** Gray. Stem often longer (1 – 3°); leaves larger (1½ – 3½′ long by 1″ wide or less), 3 – 5-nerved at base, very acute and mucronate, narrowed to the subpetiolate base. (P. Niagarensis, *Tuckerm.*) — Running water, Great Lakes to S. C.; also in Cal.

23. **P. pusíllus,** L. *Stem slender,* flattish or nearly cylindrical, often very branching; *leaves narrow- or setaceous-linear,* acuminate, *acute or subacute,* 1 – 3-*nerved,* furnished with *translucent glands* on each side at the base; stipules at first obtuse; spikes interrupted or capitate, 2 – 8-flowered, on rather long peduncles; *fruit* obliquely elliptical, *scarcely keeled; apex of embryo* incurved and *directed obliquely downward.* — Pools and ditches, N. Scotia to N. J., west to Minn. and Mo., and westward. — Leaves sometimes almost setaceous (var. tenuissimus, *Koch*).

Var. **polyphýllus,** Morong. Dwarf form (3 – 5′ high), divaricately branching from the base, very leafy throughout; leaves very obtuse, not cuspidate, 3-nerved; non-flowering but abundantly provided with propagating buds which are formed on the thickened and hardened ends of the branches and closely invested by imbricated leaves. — In a shallow pool, S. Natick, Mass.

24. **P. mucronàtus,** Schrad. Resembling P. pusillus, but stem less branching; *leaves broader* (almost 1″ wide), *often* 5-*nerved; spikes interrupted.* (P. pusillus, var. major, *Fries.*) — N. Brunswick to western N. Y., Mich., and Minn. July. (Eu.)

25. **P. gemmíparus,** Robbins. Stem filiform, branching, terete, varying greatly in height; *leaves hair-like,* sometimes not as broad as the stem, often with no apparent midrib, *tapering to the finest point* (1 – 3′ long), bi-glandular at base; stipules ½ – 1′ long; spikes few (3 – 6-flowered), *interrupted,* on long filiform peduncles; *propagating buds very numerous;* fruit like that of P. pusillus, very rare. (P. pusillus, var.? gemmiparus, *Robbins.*) — Slow-moving streams and still water, Mass. Aug., Sept.

26. **P. Tuckermàni,** Robbins. *Very slender and delicate* from a creeping rootstock, of a fine light green; stem filiform with several short and repeatedly dichotomous leaf-bearing branches; *leaves* thin and flat, but *setaceous and tapering to near the fineness of a hair* (1 – 4′ long and ⅛″ extreme width), obscurely 1 – 3-nerved, with a few coarse reticulations; stipules rather persistent below, ⅓′ long, obtuse; *peduncle solitary, very long,* rather thickened upward; *spike* 4 – 8-*flowered, in fruit continuous, oblong; fruit thick-lenticular,* obscurely 3-keeled; *nutlet slightly impressed on the sides; shell thick and hard;* embryo nearly annular. — Cold ponds, White Mountains of N. H., N. Y., and N. J.

* * *Stipules united with the sheathing base of the leaf.*

27. **P. pectinàtus,** L. *Stem filiform,* repeatedly dichotomous; *leaves very narrowly linear,* attenuate to the apex, 1-nerved with a few transverse veins; *spikes interrupted,* on long filiform peduncles; fruit obliquely broad-obovate, compressed, *bluntly keeled;* shell of nutlet very thick; *embryo spirally incurved.* — N. Brunswick to Fla., westward across the continent. Aug. – Oct. (Eu.)

28. **P. marìnus,** L. Resembling narrow-leaved forms of the last species, *low and very leafy;* peduncles much elongated; *fruit much smaller* (1″ long) and thinner, round-obovate, *not keeled* upon the rounded back, tipped with the broad sessile stigma; *embryo annular.* — Western N. Y., Ill., Mich., and southward. Probably the range of this species is much more extensive than indicated, as it has been confounded with P. pectinatus.

29. **P. Robbínsii,** Oakes. *Stem* ascending from a creeping base, *rigid,* very branching, *invested by the bases of the leaves and stipules; leaves crowded in two ranks, recurved-spreading,* narrow-lanceolate or linear (3 – 5′ long and 2 – 3″ wide), acuminate, *ciliate-serrulate* with translucent teeth, many-nerved; stipules obtuse when young, their nerves soon becoming bristles; *spikes numerous, loosely few-flowered,* on short peduncles; fruit oblong-obovate (2″ long), *keeled with a broadish wing,* acutely beaked; embryo stout, ovally annular. — In ponds and slow streams, N. Brunswick to N. J., the N. shore of L. Superior, and far westward.

## 4. RÚPPIA, L. DITCH-GRASS.

Flowers perfect, 2 or more approximated on a slender spadix, which is at first enclosed in the sheathing spathe-like base of a leaf, entirely destitute of floral envelopes, consisting of 2 sessile stamens, each with 2 large and separate anther-cells, and 4 small sessile ovaries, with solitary campylotropous suspended ovules; stigma sessile, depressed. Fruit small obliquely ovate pointed drupes, each raised on a slender stalk which appears after flowering; the spadix itself also then raised on an elongated thread-form peduncle. Embryo ovoid, with a short and pointed plumule from the upper end, by the side of the short cotyledon. — Marine herbs, growing under water, with long and thread-like forking stems, and slender almost capillary alternate leaves, sheathing at the base. Flowers rising to the surface at the time of expansion. (Dedicated to *H. B. Ruppius,* a German botanical author of the early part of the 18th century.)

1. **R. marítima,** L. Leaves linear-capillary; nut ovate, obliquely erect, 1½″ long; fruiting peduncles capillary (3 – 6′ long); stipes 1 – 12″ long. — Shallow bays, along the entire coast; also occasionally in saline places in the interior. (Eu., Asia, etc.)

## 5. ZANNICHÉLLIA, Micheli. HORNED PONDWEED.

Flowers monœcious, sessile, naked, usually both kinds from the same axil; the sterile consisting of a single stamen, with a slender filament bearing a 2–4-celled anther; the fertile of 2–5 (usually 4) sessile pistils in the same cup-shaped involucre, forming obliquely oblong nutlets in fruit, beaked with a short style, which is tipped by an obliquely disk-shaped or somewhat 2-lobed stigma. Seed orthotropous, suspended, straight. Cotyledon taper, bent and coiled. — Slender branching herbs, growing under water, with mostly opposite long and linear thread-form entire leaves, and sheathing membranous stipules. (Named in honor of *Zannichelli*, a Venetian botanist.)

1. **Z. palústris**, L. Style at least half as long as the fruit, which is flattish, somewhat incurved, even, or occasionally more or less toothed on the back (not wing-margined in our plant), nearly sessile; or, in var. PEDUNCULÀTA, both the cluster and the separate fruits evidently peduncled. — Ponds and slow streams, throughout N. America, but not common. July. (Eu., Asia.)

## 6. ZOSTÈRA, L. GRASS-WRACK. EEL-GRASS.

Flowers monœcious; the two kinds naked and sessile and alternately arranged in two rows on the midrib of one side of a linear leaf-like spadix, which is hidden in a long and sheath-like base of a leaf (spathe); the sterile flowers consisting of single ovate or oval 1-celled sessile anthers, as large as the ovaries, and containing a tuft of threads in place of ordinary pollen; the fertile of single ovate-oblong ovaries attached near their apex, tapering upward into an awl-shaped style, and containing a pendulous orthotropous ovule; stigmas 2, long and bristle-form, deciduous. Utricle bursting irregularly, enclosing an oblong longitudinally ribbed seed (or nutlet). Embryo short and thick (proper cotyledon almost obsolete), with an open chink or cleft its whole length, from which protrudes a doubly curved slender plumule. — Grass-like marine herbs, growing wholly under water, from a jointed creeping stem or rootstock, sheathed by the bases of the very long and linear, obtuse, entire, grass-like, ribbon-shaped leaves (whence the name, from *ζωστήρ, a band*).

1. **Z. marina**, L. Leaves obscurely 3–5-nerved. — Common in shoal water of bays along the coast, from Newf. to Fla. (Eu.)

## 7. NÀIAS, L. NAIAD.

Flowers diœcious or monœcious, axillary, solitary and sessile; the sterile consisting of a single stamen enclosed in a little membranous spathe; anther at first nearly sessile, the filament at length elongated. Fertile flowers consisting of a single ovary tapering into a short style; stigmas 2–4, awl-shaped; ovule erect, anatropous. Fruit a little seed-like nutlet, enclosed in a loose and separable membranous epicarp. Embryo straight, the radicular end downward. — Slender branching herbs, growing under water, with opposite and linear leaves, somewhat crowded into whorls, spinulose-toothed, sessile and dilated at base. Flowers very small, solitary, but often clustered with the branch-leaves in the axils; in summer. (*Naïás, a water-nymph.*)

1. **N. marina**, L. *Stem rather stout and often armed with broad prickles; leaves broadly linear* (3–18″ long), *coarsely and sharply toothed*, the dilated base entire; fruit 2–2½″ long; *seed very finely lineate, oblong*, slightly compressed.

(N. major, *All.*) — Marshes and salt-springs of western N. Y. and Mich. Teeth of one or more brownish cells upon a many-celled base. (Eu.)

Var. **grácilis,** Morong. Internodes long (1 – 3′) and nearly naked, with only a few teeth above; leaves very narrow, the dilated base also toothed; fruit smaller. — Canoga marshes, western N. Y.; also in Fla.

Var. **recurvàta,** Dudley. Stems short, inclined to be dichotomously branched, recurved-spreading; leaves usually recurved, the teeth prominent, the dilated base with a projecting tooth each side. — Cayuga marshes, N. Y.

2. **N. fléxilis,** Rostk. & Schmidt. *Stems usually very slender; leaves very narrowly linear* (½ – 1′ long), *very minutely serrulate;* fruit 1½″ long, narrowly oblong; *seeds lance-oval, smooth and shining.* — Ponds and slow streams, N. Scotia to S. C., Iowa and Minn. Teeth on the margins of the leaves 1-celled. (Eu.) — Var. ROBÚSTA, Morong. Stem stout, few-leaved, sparsely branching, elongated; leaves flat, abruptly acute. — E. Mass., Mich., and Tex.

3. **N. Índica,** Cham., var. **gracíllima,** A. Br. Branches alternate; *leaves* very narrowly linear, *nearly capillary,* straight, *serrate, the rounded lobes of the sheathing base spinulose-ciliate; fruit linear, impressed-dotted between the numerous ribs.* — Mass. to Penn., west to Ind. and Mo. Teeth of 3 cells each.

## ORDER 127. ERIOCAÙLEÆ. (PIPEWORT FAMILY.)

*Aquatic or marsh herbs, stemless or short-stemmed, with a tuft of fibrous roots, a cluster of linear and often loosely cellular grass-like leaves, and naked scapes sheathed at the base, bearing dense heads of monœcious or rarely diœcious small* 2 – 3-*merous flowers, each in the axil of a scarious bract; the perianth double or rarely simple, chaffy; anthers introrse;* the fruit a 2 – 3-*celled* 2 – 3-*seeded capsule;* seeds pendulous, orthotropous; embryo at the apex of mealy albumen. — Chiefly tropical plants, a few in northern temperate regions.

1. **Eriocaulon.** Perianth double, the inner (corolla) tubular-funnel-form in the staminate flowers; stamens twice as many as its lobes (4). Anthers 2-celled.
2. **Pæpalanthus.** Perianth as in the last; stamens only as many as the corolla-lobes (3). Anthers 2-celled.
3. **Lachnocaulon.** Perianth simple, of 3 sepals. Stamens 3, monadelphous below. Anthers 1-celled.

### 1. ERIOCAÙLON, L. PIPEWORT.

Flowers monœcious and androgynous, i. e. both kinds in the same head, either intermixed, or the central ones sterile and the exterior fertile, rarely diœcious. *Ster. Fl.* Calyx of 2 or 3 keeled or boat-shaped sepals, usually spatulate or dilated upward. Corolla tubular, 2 – 3-lobed, each of the lobes bearing a black gland or spot. Stamens twice as many, one inserted at the base of each lobe and one in each sinus; anthers 2-celled. Pistils rudimentary. *Fert. Fl.* Calyx as in the sterile flowers, often remote from the rest of the flower (therefore perhaps to be viewed as a pair of bractlets). Corolla of 2 or 3 separate narrow petals. Stamens none. Ovary often stalked, 2 – 3-lobed, 2 – 3-celled; style 1; stigmas 2 or 3, slender. Capsule membranaceous, lo̍culicidal. — Leaves mostly smooth, loosely cellular and pellucid, flat or concave above. Scapes or peduncles terminated by a single head, involucrate by some outer empty bracts. Flowers, also the tips of the bracts, etc., usually white-bearded or woolly. (Name compounded of ἔριον, *wool*, and καυλός, *a stalk*, from the wool at the base of the scape.) — Our species are all stemless, wholly glabrous excepting at the base and the flowers, with a depressed head and dimerous flowers.

1. **E. decangulàre,** L. *Leaves obtuse*, varying from linear-lanceolate to linear-awl-shaped, rather rigid; scapes 10 – 12-ribbed (1 – 3° high); head hemispherical, becoming globular (2 – 7″ wide); scales of the involucre acutish, straw-color or light brown; *chaff* (bracts among the flowers) *pointed*. — Pine-barren swamps, N. J. to Fla. July – Sept.

2. **E. gnaphalòdes,** Michx. *Leaves spreading* (2 – 5′ long), *grassy-awl-shaped*, rigid, or when submersed thin and pellucid, tapering gradually to a *sharp point*, mostly shorter than the sheath of the 10-*ribbed scape;* scales of the involucre very obtuse, turning lead-color; *chaff obtuse*. — Pine-barren swamps, N. J. to Fla.

3. **E. septangulàre,** Withering. *Leaves short* (1 – 3′ long), *awl-shaped, pellucid*, soft and very cellular; *scape* 4 – 7-*striate*, slender, 2 – 6′ high, or when submersed becoming 1 – 6° long, according to the depth of the water; *chaff acutish;* head 2 – 3″ broad; the bracts, chaff, etc., lead-color, except the white coarse beard. — In ponds or along their borders, Newf. to N. J., west to Ind., Mich., and Minn. July, Aug. (Eu.)

### 2. PÆPALÁNTHUS, Martius.

Stamens as many as the (often involute) lobes of the funnel-form corolla of the sterile flowers, and opposite them, commonly 3, and the flower ternary throughout. Otherwise nearly as in Eriocaulon. (Name from παιπάλη, *dust* or *flour*, and ἄνθος, *flower*, from the meal-like down or scurf of the heads and flowers of many South American species.)

1. **P. flavídulus,** Kunth. Tufted, stemless; leaves bristle-awl-shaped (1′ long); scapes very slender, simple, minutely pubescent (6 – 12′ high), 5-angled; bracts of the involucre oblong, pale straw-color, those among the flowers mostly obsolete; perianth glabrous; sepals and petals of the fertile flowers linear-lanceolate, scarious-white. — Low pine-barrens, S. Va. to Fla.

### 3. LACHNOCAÙLON, Kunth. HAIRY PIPEWORT.

Flowers monœcious, etc., as in Eriocaulon. Calyx of 3 sepals. Corolla none! *Ster. Fl.* Stamens 3; filaments below coalescent into a club-shaped tube around the rudiment of a pistil, above separate and elongated; anthers 1-celled! *Fert. Fl.* Ovary 3-celled, surrounded by 3 tufts of hairs (in place of a corolla). Stigmas 3, two-cleft. — Leaves linear-sword-shaped, tufted. Scape slender, bearing a single head, 2 – 3-angled, hairy. (Name from λάχνος, *wool*, and καυλός, *stalk*.)

1. **L. Michaùxii,** Kunth. — Low pine-barrens, Va. to Fla.

## ORDER 128. CYPERÀCEÆ. (SEDGE FAMILY.)

*Grass-like or rush-like herbs, with fibrous roots, mostly solid stems* (culms), *closed sheaths, and spiked chiefly 3-androus flowers, one in the axil of each of the glume-like imbricated bracts* (scales, glumes), *destitute of any perianth,* *or with hypogynous bristles or scales in its place; the 1-celled ovary with a single erect anatropous ovule, in fruit forming an achene.* Style 2-cleft with the fruit flattened or lenticular, or 3-cleft and fruit 3-angular. Embryo minute at the base of the somewhat floury albumen. Stem-leaves when present 3-ranked. — A large, widely diffused family.

I. Flowers all perfect, rarely some of them with stamens or pistil abortive; spikes all of one sort.

**Tribe I. SCIRPEÆ.** Spikelets mostly many-flowered, with only 1 (rarely 2) of the lower scales empty.

* Scales of the spikelet strictly 2-ranked, conduplicate and keeled.

+ Flowers destitute of bristles and of beak to the achene; inflorescence terminal.

1. **Cyperus.** Spikelets few – many-flowered, usually elongated or slender.
2. **Kyllinga.** Spikelets 1-flowered (but of 3 or 4 scales), glomerate in a sessile head.

+ + Flower furnished with bristles; achene beaked; inflorescence axillary.

3. **Dulichium.** Spikelets 6 – 10-flowered, slender, clustered on an axillary peduncle.

* * Scales of the several – many-flowered spikelet imbricated all round (subdistichous in n. 5).

+ Achene crowned with the bulbous persistent base of the style (usually deciduous in n. 7); flowers without inner scales (bractlets).

++ Hypogynous bristles (perianth) generally present; culm naked.

4. **Eleocharis.** Spikelet solitary, terminating the culm. Stamens 3.

++ ++ Bristles always none; culm leafy.

5. **Dichromena.** Spikelets crowded into a leafy-involucrate head, laterally flattened, the scales more or less conduplicate and keeled. Many of the flowers imperfect or abortive.
6. **Psilocarya.** Spikelets in broad open cymes. Style almost wholly persistent.
7. **Fimbristylis.** Spikelets in an involucrate umbel. Culm leafy at base. Style usually wholly deciduous.

+ + Style not bulbous at base.

++ Flowers without inner scales, but bristles generally present.

8. **Scirpus.** Spikelets solitary or clustered, or in a compound umbel, the stem often leafy at base and inflorescence involucrate. Barbed bristles 3 – 8 or none. Stamens mostly 3.
9. **Eriophorum.** As Scirpus, but the bristles naked, exserted and often silky in fruit. Stamens 1 – 3.

++ ++ Flower with one or more inner scales.

10. **Fuirena.** Scales of the spikelet awned below the apex. Flower surrounded by 3 stalked petal-like scales alternating with 3 bristles.
11. **Hemicarpha.** Flower with a single very minute hyaline scale next the axis of the spikelet; bristles none.
12. **Lipocarpha.** Flower enclosed by 2 inner scales, one next the axis, the other in front of the achene; bristles none.

**Tribe II. RHYNCHOSPOREÆ.** Spikelets mostly 1 – 2-flowered, with 2 – many of the lower scales empty.

13. **Rhynchospora.** Spikelets terete or flattish; scales convex, either loosely enwrapping or regularly imbricated. Achene crowned with a persistent tubercle or beak, and commonly surrounded by bristles.
14. **Cladium.** Spikelets terete, few-flowered, the scales, etc., as in the preceding. Achene destitute of tubercle. No bristles.

II. Flowers unisexual.

**Tribe III. SCLERIEÆ.** Flowers monœcious; the staminate and pistillate in the same or in different clustered spikes. Achene naked, bony or crustaceous, supported on a hardened disk.

15. **Scleria.** Spikes few-flowered; lower scales empty. No bristles or inner scales.

**Tribe IV. CARICEÆ.** Flowers monœcious in the same (androgynous) or in separate spikes, or sometimes diœcious. Achene enclosed in a sac (*perigynium*).

16. **Carex.** Hypogynous bristle short and enclosed in the perigynium or none.

## 1. CYPÈRUS, Tourn. GALINGALE. (Pl. 1.)

Spikelets many–few-flowered, mostly flat, variously arranged, mostly in clusters or heads, which are commonly disposed in a simple or compound terminal umbel. Scales 2-ranked, conduplicate and keeled (their decurrent base below often forming margins or wings to the hollow of the joint of the axis next below), deciduous when old. Stamens 1–3. No bristles or inner scales. Style 2–3-cleft, deciduous. Achene lenticular or triangular, naked at the apex. — Culms mostly triangular, simple, leafy at base, and with one or more leaves at the summit, forming an involucre to the umbel or head. Peduncles or rays unequal, sheathed at base. All flowering in late summer or autumn. (Κύπειρος, the ancient name.)

§ 1. PYCRÈUS. *Achene lenticular, the edge turned to the rhachis; spikelet flattened, many-flowered; rhachis narrow, not winged. Annuals.*

* *Umbel simple or capitate, rarely slightly compound.*

1. **C. flavéscens,** L. Culms 4–10′ high; spikelets 5–8″ long; involucre 3-leaved, very unequal; spikelets becoming linear, obtuse, clustered on the 2–4 very short rays (peduncles); *scales obtuse, straw-yellow; stamens* 3; *achene shining, orbicular,* its superficial cells oblong. — Low grounds, N. Eng. to Mich., Ill., and southward. (Eu., etc.)

2. **C. diándrus,** Torr. (Pl. 1, fig. 1–4.) Spikelets lance-oblong (3–9″), scattered or clustered on the 2–5 very short or unequal rays; *scales rather obtuse, purple-brown* on the margins or nearly all over; *stamens* 2, *or sometimes* 3; *achene dull, oblong-obovate;* otherwise much like the last. — Low grounds, common from the Atlantic to Minn., Ark., and N. Mex. — Var. CASTÀNEUS, Torr. Scales more firm and browner; with the type.

3. **C. Nuttàllii,** Torr. Culms 4–12′ high; spikelets lance-linear, acute and very flat (½–1′ long), crowded on the few usually very short (or some of them distinct) rays; *scales oblong, yellowish-brown,* rather loose; *stamens* 2; *achene oblong-obovate, very blunt, dull.* — Mostly in salt or brackish marshes, along the coast, from Mass. to the Gulf.

4. **C. polystàchyus,** Rottb., var. **leptostàchyus,** Boeckl. Culms very slender, 6–15′ high; leaves and elongated involucre very narrow; spikelets few to many on the 4–8 rays, linear, acute, 2–9″ long; *scales thin, ovate, acute, closely imbricated, pale brown;* stamens 2; *achene linear-oblong or clavate, short-pointed, grayish and minutely pitted.* (C. microdontus, *Torr.*) — Margins of ponds and streams, Va. to Fla. and Tex.

* * *Umbel compound.*

5. **C. flavícomus,** Vahl. Culm stout (1–3° high); leaves of the involucre 3–5, very long; spikelets linear (4–9″ long), spiked and crowded on the whole length of the branches of the several-rayed umbel, spreading; *scales oval, very obtuse, yellowish and brownish, broadly scarious- (whitish-) margined; stamens* 3; *achene obovate, mucronate,* blackish. — Low grounds, Va. to Fla.

§ 2. CYPERUS proper. *Achene triangular; spikelets usually many-flowered, more or less flattened, with carinate scales, the rhachis marginless or nearly so* (*winged in* n. 12).

* *Stamen* 1; *spikelets short and small* (1½ – 5″ *long*) *in globular heads, ovate or linear-oblong, many-flowered; achene oblong-obovate to linear.*

+ *Low annuals; involucre* 2 – 3-*leaved; heads few; scales pointed.*

6. **C. aristàtus,** Rottb. Dwarf (1 – 5′ high); *spikelets chestnut-brown, oblong becoming linear,* 7 – 13-flowered, in 1 – 5 ovate heads (sessile and clustered, or short-peduncled); *scales nerved, tapering to a long recurved point:* achene oblong-obovate, obtuse. (C. inflexus, *Muhl.*) — Sandy wet shores; common. Sweet-scented in drying.

7. **C. acuminàtus,** Torr. Slender (3 – 12′ high); *spikelets ovate, becoming oblong,* 16 – 30-flowered, *pale; scales obscurely 3-nerved, short-tipped;* achene oblong, pointed at both ends. — Low ground, Ill. and southwestward.

+ + *Tall perennial* (1 – 4° *high*); *heads many, greenish; scales pointless.*

8. **C. calcaràtus,** Nees. Culm obtusely triangular; leaves and involucre very long, keeled; umbel compound, many-rayed; spikelets ovate (1½″ long), in numerous small heads; achenes pale, linear, on a slender stipe; scales narrow, acutish, obscurely 3-nerved. (C. virens, *Gray*, in part; not *Michx.* C. Luzulæ, var. umbellatus, *Britt.*) — Wet places, Del. to Fla. and Tex.

* * *Stamens* 3 (2 *in* C. fuscus); *spikelets clustered on the rays of a simple umbel* (*or in a single sessile head*); *scales mostly green or greenish and many-nerved, abruptly sharp-pointed; achene obovate, sharply triangular.*

+ *Low annuals.*

9. **C. compréssus,** L. Culms 3 – 9′ high, with a simple sessile or a few umbellate clusters of oblong to linear spikelets (15 – 30-flowered and 3 – 8″ long) with crowded strongly keeled and very acute pale scales. — Sterile fields along the coast, Md. to Fla. and Tex.; also adventive near Philadelphia.

**C.** FÚSCUS, L. Of similar habit; spikelets much smaller (2 – 4″ long), the thin brown scales (greenish only on the keel) barely acutish and very faintly nerved. — Revere Beach, Mass. (*Young*); on ballast at Philadelphia. (Adv. from Eu.)

+ + *Perennial, propagating from hard clustered corms or bulb-like tubers.*

10. **C. Schweinítzii,** Torr. *Culm rough on the angles* (1 – 2° *high*); umbel 4 – 8-rayed, rays very unequal, erect; *spikelets loosely or somewhat remotely* 6 – 12-*flowered, with convex many-nerved scales;* joints narrowly winged. — Dry sandy shores and ridges, western N. Y. and Penn. to Minn. and Kan.

11. **C. filicúlmis,** Vahl. Culm slender, wiry, often reclined (8 – 15′ high); *leaves linear* (½ – 2″ wide) or filiform; *spikelets numerous and clustered in one sessile dense head, or in* 1 – 7 *additional looser heads on spreading rays* of an irregular umbel; *joints of the axis naked; scales blunt,* greenish. — Dry sterile soil; common, especially southward.

12. **C. Gràyii,** Torr. Culm thread-form, wiry (6 – 12′ high); *leaves almost bristle-shaped,* channelled; *umbel simple,* 4 – 6-*rayed; spikes* 5 – 10 *in a loose head, spreading; joints of the axis winged; scales rather obtuse,* greenish-chestnut-color. — Barren sands, Plymouth, Mass., to N. J., near the coast.

§ 3. PAPŶRUS. *Style 3-cleft; achene triangular; stamens 3; spikelets many-flowered, flattened, the carinate scales decurrent upon the rhachis as scarious wings; spikes in simple or compound umbels.*

* *Wings of the rhachis soon separating to the base as a pair of free scales; annual.*

13. **C. erythrorhizos**, Muhl. (Pl. 1, fig. 5 – 8.) Culm obtusely triangular (3′ – 3° high); umbel many-rayed; involucre 4 – 5-leaved, very long; involucels bristle-form; spikelets very numerous, crowded in oblong or cylindrical nearly sessile heads or spikes, spreading horizontally, linear, flattish (3 – 6″ long), bright chestnut-colored; scales lanceolate, mucronulate. — Alluvial banks, L. I. to Penn., Mich., Minn., and southward; also adventive in N. Eng.

* * *Wings of the rhachis persistently attached; perennial by slender running rootstocks.*

+ *Achene round-obovate; scales mucronate or acute, free or spreading.*

14. **C. Háspan**, L. Culms sharply angled (1 – 1½° high); leaves linear, often reduced to membranous sheaths; *umbel spreading, the filiform rays mostly longer than the 2-leaved involucre;* spikelets narrowly linear; scales light reddish-brown, oblong, *mucronate, 3-nerved.* — Ponds and ditches, Va. to Fla. and Tex.

15. **C. dentàtus**, Torr. (Pl. 1, fig. 9.) Culms slender (1° high); leaves rigid and keeled; *umbel erect, shorter than the 3 – 4-leaved involucre;* scales reddish-brown, *with green keel,* ovate, *acute, 7-nerved.* — Sandy swamps, N. Eng. and northern N. Y. to S. C. and W. Va. Spikes often abortive and changed into leafy tufts.

+ + *Achene linear to oblong; scales appressed, pointless or nearly so.*

++ *Perennial by tuberiferous stolons.*

16. **C. rotúndus**, L. (NUT-GRASS.) Culm slender (½ – 1½° high), longer than the leaves; umbel simple or slightly compound, about equalling the involucre; the few rays each bearing 4 – 9 *dark chestnut-purple* 12 – 40-flowered *acute spikelets* (4 – 9″ long); *scales ovate, closely appressed, nerveless* except on the keel. — Sandy fields, Va. to Fla. and Tex.; also adventive near Philadelphia and New York city. (Eu.)

17. **C. esculéntus**, L. Culm (1 – 2½° high) equalling the leaves; umbel often compound, 4 – 7-rayed, much shorter than the long involucre; *spikelets numerous, light chestnut or straw-color, acutish;* 12 – 30-flowered (4 – 7″ long); *scales ovate or ovate-oblong narrowly scarious-margined, nerved,* the acutish *tips rather loose;* achene oblong-obovate. (C. phymatodes, *Muhl.*) — Low grounds, along rivers, etc., N. Brunswick to Fla., west to Minn. and Tex.; spreading extensively by its small nut-like tubers and becoming a pest in cultivated grounds.

++ ++ *Perennial, propagating by corm-like tubers from the base; spikelets narrow, acuminate, often teretish; scales oblong-lanceolate; achene linear-oblong.*

18. **C. strigòsus**, L. Culm mostly stout (1 – 3° high); most of the rays of the umbel elongated (1 – 5′), their sheaths 2-bristled; *spikelets* 5 – 25-*flowered,* spreading; scales several-nerved, much longer than the achene. — Damp or fertile soil, Canada to Fla., west to Minn., Tex., and the Pacific. Very variable in the number and length of the rays of the simple or compound umbel, and in the size of the spikelets (2½ – 6 or even 12″ long), more or less densely crowded on the axis.

§ 4. DICLÍDIUM. *Style 3-cleft; spikelets narrow, terete or nearly so, few – many-flowered, the scales closely appressed and the broad wings of the jointed rhachis enclosing the triangular achene.*

19. **C. speciòsus,** Vahl. Culm stout, *mostly low* (5 – 20′ high); *rays of the simple or compound umbel mostly all short and crowded; spikelets* 10 – 20-*flowered, yellowish-brown* at maturity (3 – 7″ long), the short joints of its axis winged with very broad scaly margins which embrace the *ovate triangular achene; the scales ovate, obtusish, imbricately overlapping.* (C. Michauxianus, *Gray,* Manual; not *Schultes.*) — Low grounds and sandy banks, N. Eng. to Fla., west to Minn. and Tex.

20. **C. Engelmánni,** Steud. Resembles n. 19; but the *spikelets more slender* and terete, *somewhat remotely* 5 – 15-*flowered,* the zigzag joints of the axis slender and narrowly winged, and the oblong or oval broadly scarious *scales proportionally shorter,* so as to expose a part of the axis of each joint, *the successive scales not reaching the base of the one above* on the same side; achene oblong-linear, very small. — Low grounds, Mass. to Wisc. and southward.

§ 5. MARÍSCUS. *Spikelets* 1 – 4-*flowered, subterete, usually in dense heads; scales appressed, several-nerved, the lower empty and often persistent after the fall of the rest of the spikelet; joints of the rhachis winged, enclosing the triangular achene. Perennial.*

* *Spikelets slender and acuminate, more or less refracted in usually close umbelled spikes. — Connecting with* § 4.

21. **C. Lancastriénsis,** Porter. Culm (1 – 2° high) triangular; *leaves rather broadly linear;* umbel of 6 – 9 mostly elongated rays; *spikelets very numerous in short-oblong close heads,* soon reflexed, of 3 – 6 narrow scales, the upper and lower empty, twice the length of the linear-oblong achene, which is nearly 1″ long. — Rich soil, Penn. and N. J. to Ala.

22. **C. retrofráctus,** Torr. Culm and leaves usually minutely downy and rough on the obtusish angles (1 – 3° high); umbel many-rayed; *spikelets slender-awl-shaped,* very numerous in obovate or oblong heads terminating the elongated rays, *soon strongly reflexed,* 1 – 2-*flowered* in the middle (3 – 5″ long); scales usually 4 or 5, the two lowest ovate and empty, the fertile lanceolate and pointed, the uppermost involute-awl-shaped; achene linear, 1¼″ long. — Sandy fields, N. J. to Fla. and Tex.

23. **C. refráctus,** Engelm. Culm 1 – 2° high; rays usually more or less elongated; spikelets very slender, in rather loose heads, divaricate or more or less reflexed, 2 – 4-flowered; achene linear, 1¼″ long. — N. J. to N. C. and Mo.

* * *Spikelets very short, blunt, in densely compacted globose or cylindrical heads.*

24. **C. ovulàris,** Torr. Culm sharply triangular (6′ – 2° high); umbel 1 – 6-rayed; *spikelets* (50 – 100) in a *globular head, 3-flowered, oblong, blunt* (1½ – 2″ long); scales ovate, obtuse, a little longer than the ovate-oblong achene. — Sandy dry soil, southern N. Y. to Fla., west to Ill., Ark., and Tex. — Var. ROBÚSTUS, Boeckl., is a form with large heads (4 – 8″ long), the spikelets 3 – 4-flowered. (C. Wolfii, *Wood.*) — Ill. to Ark., and southward.

25. **C. Torrèyi,** Britton. Like the last, but the *heads cylindrical or oblong, spikelets usually 2-flowered,* and *achene linear-oblong.* — L. Island to Fla., west to Tex.

## 2. KYLLÍNGA, Rottboell. (Pl. 1.)

Spikelets of 3 or 4 two-ranked scales, 1 – 1½-flowered; the 2 lower scales minute and empty, as in Cyperus, § 4, but style oftener 2-cleft and achene lenticular; spikes densely aggregated in solitary or triple sessile heads. — Culms leafy at base; involucre 3-leaved. (Named after *Peter Kylling*, a Danish botanist of the 17th century.)

1. **K. pùmila,** Michx. Annual; culms 2 – 9′ high; head globular or 3-lobed, whitish-green (about 4″ broad); spikelets strictly 1-flowered; upper scales ovate, pointed, rough on the keel; stamens and styles 2; leaves linear — Low grounds, Ohio to Ill., south to Fla. and Tex. Aug.

## 3. DULÍCHIUM, Pers. (Pl. 1.)

Spikelets many- (6 – 10-) flowered, linear, flattened, sessile in 2 ranks on axillary solitary peduncles emerging from the sheaths of the leaves; scales 2-ranked, lanceolate, decurrent, forming flat wing-like margins on the joint below. Perianth of 6 – 9 downwardly barbed bristles. Stamens 3. Style 2-cleft above. Achene flattened, linear-oblong, beaked with the long persistent style. — A perennial herb, with a terete simple hollow culm (1 – 2° high), jointed and leafy to the summit; leaves short and flat, linear, 3-ranked. (An alteration of *Dulcichinum,* an old name for a species of Cyperus.)

1. **D. spathàceum,** Pers. — Borders of ponds, N. Scotia to Fla., west to Minn. and Tex. July – Sept.

## 4. ELEÓCHARIS, R. Br. SPIKE-RUSH. (Pl. 3.)

Spikelet single, terminating the naked culm, many – several-flowered. Scales imbricated all round in many (rarely in 2 or 3) ranks. Perianth of 3 – 12 (commonly 6) bristles, usually rough or barbed downward, rarely obsolete. Stamens 2 – 3. Style 2 – 3-cleft, its bulbous base persistent as a tubercle jointed upon the apex of the lenticular or triangular achene. — Leafless, chiefly perennial, with tufted culms sheathed at the base, from matted or creeping rootstocks; flowering in summer. (Name from ἕλος, *a marsh*, and χαίρω, *to delight in;* being marsh plants.)

§ 1. *Spikelet terete, hardly if at all thicker than the spongy-cellular culm; scales firmly persistent; style mostly 3-cleft; bristles* 6 (*rarely* 7), *firm or rigid, mostly barbed downward, equalling or surpassing the triangular or lenticular achene.*

* *Spikelet linear or lanceolate-awl-shaped, few-flowered; scales* (*only* 3 – 9) *few-ranked, convolute-clasping the long flattened joints of the axis, lanceolate, herbaceous* (*green*) *and several-nerved on the back, and with thin scarious margins.*

1. **E. Robbínsii,** Oakes. *Flower-bearing culms exactly triangular*, rather stout, erect (8′ – 2° high), also producing tufts of capillary abortive stems or fine leaves, which float in the water; sheath obliquely truncate; spikelet 4 – 10″ long; achene oblong-obovate, triangular, minutely reticulated, about half the length of the bristles, tipped with a flattened awl-shaped tubercle. — Shallow water, N. Eng. to Fla.

* * *Spikelet cylindrical, many-flowered, 1 – 2′ long; scales in several ranks, firm-coriaceous with scarious margin, pale, nerveless or faintly striate; culms large and stout* (2 – 4° *high*); *basal sheaths often leaf-bearing.*

2. **E. equisetoìdes,** Torr. *Culm terete, knotted as if jointed by many cross-partitions; achene smooth* (the minute reticulation transversely linear-rectangular), with a conical-beaked tubercle. — Shallow water, R. I. to Fla., west to Mich. and Tex.

3. **E. quadrangulàta,** R. Br. (Pl. 3, fig. 6 – 9.) *Culm continuous and sharply 4-angled; achene finely reticulated,* with a conical flattened distinct tubercle. — Shallow water, central N. Y. to Mich., and southward; rare.

§ 2. *Spikelet terete and turgid-ovate, much thicker than the very slender culm; scales thin-coriaceous or firm-membranaceous, persistent, ovate; style 3-cleft; bristles stout, barbed downward* (*or sometimes upward*), *as long as the striate and pitted-reticulated triangular achene and its tubercle; culms tufted from fibrous roots,* 1 – 2° *high.*

4. **E. tuberculòsa,** R. Br. (Pl. 3, fig. 10.) *Culms flattish,* striate; spikelet 3 – 6″ long, many-flowered; *tubercle flattish-cap-shaped, as large as the body of the achene.* — Wet sandy soil, from Mass. along the coast to Fla.

5. **E. tórtilis,** Schult. *Culms sharply triangular, capillary,* twisting when dry; spikelet 2 – 3″ long, few-flowered; *conical-beaked tubercle much smaller than the achene.* (E. simplex, *Torr.*) — Eastern shore of Md. to Fla.

§ 3. *Spikelets terete, much thicker than the culm, many-flowered; scales imbricated in many or more than* 3 *ranks, thin-membranaceous or scarious, with a thicker midrib, usually brownish or purplish, sometimes deciduous.*

* *Style 2-cleft* (*often 3-cleft in* n. 7 *and* 10) *and the smooth achene lenticular: culms slender or thread-form, terete or compressed.*

+ *Annuals; culms tufted, from fibrous roots.*

6. **E. capitàta,** R. Br. Culms terete, $\frac{1}{4}$ – 8′ high or more; *spikelets ovate to oblong* (1 – 3″ long), obtuse, 15 – 40-flowered; *scales thickish,* round-ovate, *obtuse,* brown or brownish with green keel and paler margins; stamens 2; achene obovate, *black, about equalling the* 6 – 8 *bristles,* tipped with a flattened or saucer-shaped tubercle. (E. dispar, *E. J. Hill.*) — In sand or gravel near sloughs, Md. (*Canby*) to Fla. and Tex.; N. Ind. (*Hill*). (S. Am., etc.)

7. **E. ovàta,** R. Br. Culms nearly terete, 8 – 14′ high; *spikelet globose-ovoid to ovate-oblong, obtuse,* 1 – 6″ long (dull brown); *scales very obtuse, densely crowded in many ranks; style* 3- (rarely 2-) *cleft;* achene obovate with narrow base, pale-brownish, shining, shorter than the 6 – 8 bristles, *broader than the short-deltoid, acute and flattened tubercle.* (E. obtusa, *Schult.*) — Muddy places, N. Brunswick to Minn., south and westward. Variable as to the length of its bristles. A low form, with smaller and more narrowly obovate achenes, and the bristles very short or none, is E. diandra, *Wright.* A dwarf form occurs with very small and few-flowered heads. (Eu.)

8. **E. Engelmánni,** Steud. Like the last; spikelets usually narrowly cylindrical and acute or acutish, 2 – 8″ long; achene broad and truncate, the tubercle covering the summit; bristles not exceeding the achene. (E. obtusa, var. detonsa, *Gray.*) — Mass. to Penn. and Mo.

+ + *Perennials, with running rootstocks.*

9. **E. olivàcea,** Torr. (Pl. 2, fig. 1-5.) Culms flattish, grooved, diffusely tufted on slender matted rootstocks (2-4′ high); *spikelet ovate, acutish, 20-30-flowered; scales ovate, obtuse,* rather loosely imbricated (purple with a green midrib and slightly scarious margins); achene obovate, dull, abruptly beaked with a narrow tubercle, shorter than the 6-8 *bristles.* — Wet, sandy soil, Mass. to N. C., and western N. Y.

10. **E. palústris,** R. Br. Culms nearly terete, striate, 1-5° high; *spikelet oblong-lanceolate, pointed, many-flowered; scales ovate-oblong,* loosely imbricated, reddish-brown with a broad and translucent whitish margin and a greenish keel, the upper acutish, the lowest rounded and often enlarged; achene rather narrowly obovate, somewhat shining, crowned with a short ovate or ovate-triangular flattened tubercle, shorter than the *usually* 4 *bristles.* — Very common, either in water, when it is pretty stout and tall, or in wet grassy grounds, when it is slender and lower. (Eu., Asia.) — Var. GLAUCÉSCENS, Gray. Culms slender or filiform; tubercle narrower, acute, beak-like, sometimes half as long as the achene. With the type. — Var. CÁLVA, Gray. Bristles none; tubercle short, but narrower than in the type. — Var. VÌGENS, L. H. Bailey. Culms very stout, rigid; achene more broadly obovoid. Lake Champlain and along the Great Lakes to Minn.

* * *Achene triangular or turgid; style 3-cleft*

+ *Bristles at least equalling the smooth achene, downwardly barbed, persistent.*

11. **E. rostellàta,** Torr. *Culms flattened and striate-grooved,* wiry, erect (1-2½° high), *the sterile ones reclining, rooting and proliferous* from the apex (1-2° high), the sheath transversely truncate; *spikelet spindle-shaped,* 12-20-flowered; scales ovate, obtuse (light-brown); achene obovate-triangular, narrowed into the confluent pyramidal tubercle, which is overtopped by the 4-6 bristles. — Marshes, N. Eng. to S. C., west to Mich. and Ky.

12. **E. intermèdia,** Schultes. *Culms capillary, wiry,* striate-grooved, densely tufted from fibrous roots, *diffusely spreading or reclining* (6-12′ long); *spikelet oblong-ovate, acutish, loosely* 10-20-*flowered* (2-3″ long); scales oblong, obtuse, green-keeled, the sides purplish-brown; achene obovoid with a narrowed base, beaked with a slender conical-awl-shaped distinct tubercle, which nearly equals the 6 bristles. — Wet slopes, Penn. to Iowa, north to Canada.

13. **E. Torreyàna,** Boeckl. Like the preceding, but more capillary and heads smaller (1½-2″ long), *sometimes proliferous,* the one or more short new culms from the axil of its lowest scale, which persists as an herbaceous bract; achene very much smaller, with sharper angles and a short conical tubercle, which is hardly equalled by the 3-6 slender bristles. (E. microcarpa, var. filiculmis, *Torr.*) — Wet pine-barrens, N. J. to Fla.

+ + *Bristles* 2-4, *shorter than the achene, slender and fragile, or none.*

14. **E. ténuis,** Schultes. *Culms almost capillary, erect* from running rootstocks, 4-*angular* and flattish (1° high), the sides concave; *spikelet elliptical, acutish,* 20-30-*flowered* (3″ long); *scales ovate, obtuse,* chestnut-purple with a broad scarious margin and green keel; *achene obovate, roughish-wrinkled, crowned with a small depressed tubercle,* persistent after the fall of the scales; bristles ½ as long as the achene or none. — N. Scotia to N. C., Minn., and Mo. June.

15. **E. compréssa,** Sullivant. *Culms flat*, striate, tufted, erect (1 – 2° high); *spikelet ovate-oblong*, or at length lanceolate, 20 – 30-*flowered* (4 – 7″ long); *scales lanceolate-ovate, acute,* dark purple with broad white pellucid margins and summit; *achene* yellowish, *obovate-pear-shaped,* obtusely triangular, *wrinkled, crowned with a small conical* and pointed *tubercle; bristles* 1 – 4, *very slender,* fragile, shorter than or equalling the achene (sometimes none or a single rudiment). — Wet places, N. Y. and Ont. to Minn. and Mo.

16. **E. melanocárpa,** Torr. *Culms flattened*, grooved, wiry, erect (9 – 18′ high); *spikelet cylindrical-ovoid or oblong, thick,* obtuse, densely many-flowered (3 – 6″ long); scales closely many-ranked, roundish-ovate, very obtuse, brownish with broad scarious margins; *achene smooth, obovate-top-shaped, obtusely triangular, the broad summit entirely covered like a lid by the flat depressed tubercle,* which is raised in the centre into a short abrupt triangular point; bristles often obsolete; achene soon blackish. — Wet sand, Mass. to Fla.

17. **E. tricostàta,** Torr. *Culms flattish* (1 – 2° high); *spikelet soon cylindrical,* densely many-flowered (6 – 9″ long), thickish; scales ovate, very obtuse, rusty brown, with broad scarious margins; *achene obovate, with* 3 *prominent thickened angles, minutely rough-wrinkled, crowned with a short-conical acute tubercle;* bristles none. — N. J. to Fla.

18. **E. Wólfii,** Gray. Culms slender (1° high), from very small creeping rhizomes, 2-*edged;* spikelet ovate-oblong, acute; scales ovate-oblong, obtuse, scarious, pale purple; achene pyriform, shining, *with* 9 *nearly equidistant obtuse ribs and transverse wrinkles between them; tubercle depressed, truncate,* more or less apiculate; bristles not seen. — Wet prairies, N. Iowa and S. Minn.

§ 4. *Spikelet more or less flattened, thicker than the slender or capillary culm, few – many-flowered; the thin membranaceous scales somewhat* 2 – 3-*ranked; style* 3-*cleft; bristles of the perianth* 3 – 6, *fragile or fugacious. Small or delicate species, differing from the last division chiefly in the flattish spikelets.*

* *Tubercle contracted at its junction with the achene.*

19. **E. aciculàris,** R. Br. Culms finely capillary (2 – 8′ long), *more or less* 4-*angular;* spikelet 3 – 9-flowered; scales ovate-oblong, rather obtuse (greenish with purple sides); achene obovate-oblong, *with* 3-*ribbed angles and* 2 – 3 *times as many smaller intermediate ribs,* also transversely striate, longer than the 3 – 4 very fugacious bristles; *tubercle conical-triangular.* — Muddy shores, across the continent. (Eu., Asia.)

20. **E. pygmæ̀a,** Torr. Culms bristle like, flattened and grooved (1 – 2′ high); spikelet ovate, 3 – 8-flowered; scales ovate (greenish), the upper rather acute; *achene ovoid, acutely triangular, smooth and shining, tipped with a minute tubercle;* bristles mostly longer than the fruit, sometimes wanting. — Brackish marshes, from N. Brunswick to Fla.

* * *Tubercle continuous with the nutlet and not contracted at base.*

21. **E. pauciflòra,** Link. Culms striate-angled, very slender (3 – 9′ high), scarcely tufted, on slender running rootstocks, with a short truncate sheath at base; scales of the ovate spikelet evidently 2-ranked, chestnut-brown, pointless, all flower-bearing, the two lower larger; bristles 3 – 6, about as long as the conspicuously beaked triangular achene. (Scirpus pauciflorus, *Lightfoot.*) — Wet places, N. Y. to N. Ill. and Minn., north and westward. (Eu., Asia.)

## 5. DICHRÒMENA, Richard. (Pl. 4.)

Spikelets aggregated in a terminal leafy-involucrate head, more or less compressed, few-flowered, all but 3 or 4 of the flowers usually imperfect or abortive. Scales imbricated somewhat in 2 ranks, more or less conduplicate or boat-shaped, keeled, white or whitish. Stamens 3. Style 2-cleft Perianth, bristles, etc., none. Achene lenticular, wrinkled transversely, crowned with the persistent and broad tubercled base of the style. — Culms leafy, from creeping perennial rootstocks; the leaves of the involucre mostly white at the base (whence the name, from δίς, *double*, and χρῶμα, *color*).

1. **D. leucocéphala,** Michx. Culm triangular (1 – 2° high); leaves narrow; those of the involucre 4 – 7; achene truncate, not margined. — Damp pine-barrens, N. J. to Fla. Aug., Sept.

2. **D. latifòlia,** Baldwin. (Pl. 4, fig. 1 – 5.) Culm stouter, nearly terete; leaves broadly linear, those of the involucre 8 or 9, tapering from base to apex; achene round-obovate, faintly wrinkled, the tubercle decurrent on its edges. — Low pine-barrens, Va. to Fla.

## 6. PSILOCÁRYA, Torr. BALD-RUSH. (Pl. 4.)

Spikelets ovoid, terete, the numerous scales all alike and regularly imbricated, each with a perfect flower. Perianth (bristles) wholly wanting. Stamens mostly 2. Style 2-cleft, its base or the greater part of it enlarging and hardening to form the beak of the lenticular or tumid more or less wrinkled achene. — Annuals, with leafy culms, the spikelets in terminal and axillary cymes. (Name from ψιλός, *naked*, and καρύα, *nut*.)

1. **P. scirpoides,** Torr. Annual (4 – 10′ high), leafy; leaves flat; spikelets 20 – 30-flowered; scales oblong-ovate, acute, chestnut-colored; achene somewhat margined, beaked with a sword-shaped almost wholly persistent style. (Rhynchospora scirpoides, *Gray*.) — Inundated places, S. N. Eng.

## 7. FIMBRÍSTYLIS, Vahl. (Pl. 3.)

Spikelets several - many-flowered, terete; scales all floriferous, regularly imbricated in several ranks. Perianth (bristles, etc.) none. Stamens 1 – 3. Style 2 – 3-cleft, often with a dilated or tumid base, which is deciduous (except in n. 4) from the apex of the naked lenticular or triangular achene. Otherwise as in Scirpus. — Culms leafy at base. Spikelets in our species umbelled, and the involucre 2 – 3-leaved. (Name compounded of *fimbria*, a fringe, and *stylus*, style, which is fringed with hairs in the genuine species.)

* *Style 2-cleft, flattened and ciliate; achene lenticular; tubercle soon deciduous; spikelets many-flowered.*

1. **F. spadícea,** Vahl, var. **castànea,** Gray. Culms (1 – 2½° high) tufted from a *perennial root, rigid*, as are the *thread-form convolute-channelled leaves*, smooth; spikelets ovate-oblong becoming cylindrical, dark chestnut-color (2″ thick); *stamens 2 or 3*; *achene very minutely striate and reticulated.* — Salt marshes along the coast, N. Y. and N. J. to Fla. July – Sept. — Scales lighter colored than in the tropical form.

2. **F. láxa,** Vahl. (Pl. 3, fig. 1 – 5.) Culms slender (2 – 12′ high) from an *annual root, weak*, grooved and flattish; *leaves linear, flat, ciliate-denticulate,*

*glaucous,* sometimes hairy; spikelets ovate, acute (3″ long); *stamen* 1; *achene conspicuously* 6–8-*ribbed on each side, and with finer cross-lines.* — Low ground, Penn. to Fla., west to Ill. and La. July–Sept.

* * *Style 3-cleft and achene triangular; tubercle soon deciduous; spikelets smaller and fewer-flowered.*

3. **F. autumnàlis,** Roem. & Schult. (Pl. 3, fig. 6–9.) Annual (3–16′ high), in tufts; culms flat, slender, diffuse or erect; leaves flat, acute; umbel compound; spikelets oblong, acute (1–2″ long), single or 2–3 in a cluster; scales ovate-lanceolate, mucronate; stamens 1–3. — Low grounds, Maine to Fla., west to Ill. and La.

* * * *Style 3-cleft, filiform and not ciliate; achene acutely triangular; tubercle more or less persistent.*

4. **F. capillàris,** Gray. Low annual, densely tufted (3–9′ high); culm and leaves nearly capillary, the latter short; umbel compound or panicled; spikelets (2″ long) ovoid-oblong; stamens 2; achene minutely wrinkled, very obtuse. — Sandy fields, N. Eng. to Fla., west to Minn., Tex., and the Pacific.

**F.** VÁHLII, Link (F. congesta, *Torr.*), a diminutive southern species, with long filiform leaves, sessile capitate spikelets, narrow acuminate scales, and the style 2-cleft and not ciliate, has been found in ballast-sand along the northern coast.

## 8. SCÍRPUS, Tourn. BULRUSH OR CLUB-RUSH. (Pl. 3.)

Spikelets several–many-flowered, solitary or in a terminal cluster which is subtended by a 1–several-leaved involucre (this when simple often appearing like a continuation of the culm), terete, the scales being regularly imbricated all round in many or several ranks, or rarely somewhat compressed and the fewer scales inclining to be 2-ranked. Flowers to all the scales, or to all but one or two of the lowest, all perfect. Perianth of 3–6 mostly retrorsely barbed or ciliate bristles (not elongated), or sometimes wanting. Stamens mostly 3. Style 2–3-cleft, simple, not bulbous at base, wholly deciduous, or sometimes leaving a tip or point to the lenticular or triangular achene. — Culms sheathed at base; the sheaths usually leaf-bearing. Mostly perennials; flowering in summer. (The Latin name of the Bulrush.)

* *Spikelets solitary, few-flowered, small, often flattish: achene triangular, smooth.*

+ *Involucre a short awl-shaped bract: culms tufted* (3–12′ *high*), *filiform.*

1. **S. cæspitòsus,** L. *Culms terete,* wiry, densely sheathed at base, in compact turfy tufts; the upper sheath bearing a very *short awl-shaped leaf;* spikelet ovoid, rusty-color; involucral bract a rigid-pointed scale, resembling the lowest proper scale of the spikelet and scarcely surpassing it; *bristles* 6, *smooth,* longer than the abruptly short-pointed achene. — Coast of Maine, alpine summits of N. Eng., swamps of northern N. Y., N. Ill., Minn., and northward; also on Roan Mt., N. C. (Eu.)

2. **S. Clintònii,** Gray. *Culms acutely triangular,* almost bristle-like; sheaths at the base bearing a *very slender almost bristle-shaped leaf* shorter (usually very much shorter) than the culm; involucral bract awl-shaped, mostly shorter than the chestnut-colored ovate spikelet, which has *pointless scales;* otherwise as the next. — Rather dry plains, N. Y. June.

3. **S. planifòlius,** Muhl. *Culms triangular, leafy* at base; *leaves linear, flat, as long as the culm,* and like it rough-edged; involucral bract a bristle-tipped scale usually overtopping the ovate or oblong chestnut-colored spikelet, the green midrib of the *scales extended into sharp points*; *bristles upwardly hairy,* as long as the pointless achene. — Dry or moist ground, N. Eng. to Del., west to western N. Y. and Penn.; W. Mo (*B. F. Bush.*).

+ + *One-leaved involucre more conspicuous, and as if continuing the culm.*

4. **S. subterminàlis,** Torr. Aquatic; culms (1 – 3° long, thickish-filiform) partly and the shorter filiform leaves wholly submersed, cellular; the filiform green bract 6 – 12″ long, much surpassing the oblong spikelet; scales somewhat pointed; bristles 6, bearded downward, rather shorter than the abruptly-pointed achene. — Slow streams and ponds, N. Eng. to N. J., west to Mich. and N. Ind. — Var. TERRÉSTRIS, Paine; less tall, with firmer stem and leaves, and fruiting spike more turgid. Growing chiefly emersed; Herkimer Co., N. Y.

* * *Spikelets clustered* (*rarely only one*), *appearing lateral, the one-leaved involucre resembling and seeming to be a continuation of the naked culm.*

+ *Culm sharply triangular, stout, chiefly from running rootstocks; spikelets many-flowered, rusty brown, closely sessile in one cluster; sheaths at base more or less leaf-bearing.*

5. **S. púngens,** Vahl. Running rootstocks long and stout; *culm sharply 3-angled* throughout (1 – 4° high) with concave sides; *leaves* 1 – 3, *elongated* (4 – 10′ long), keeled and channelled; spikelets 1 – 6, capitate, ovoid, usually long, overtopped by the pointed involucral leaf; scales ovate, sparingly ciliate, 2-cleft at the apex and awn-pointed from between the acute lobes; *anthers tipped with an awl-shaped minutely fringed appendage; style 2-cleft* (rarely 3-cleft); bristles 2 – 6, shorter than the obovate plano-convex and mucronate smooth achene. — Borders of salt and fresh ponds and streams, throughout N. Am. (Eu., S. Am.)

6. **S. Torrèyi,** Olney. Rootstocks slender if any (so that the plant is readily pulled up from the mud); *culm 3-angled,* with concave sides, rather slender (2 – 4° high), *leafy at base; leaves* 2 or 3, *more than half the length of the culm,* triangular-channelled, slender; *spikelets* 1 – 4, *oblong or spindle-shaped, acute, distinct,* pale chestnut-color, long overtopped by the slender erect involucral leaf; scales ovate, smooth, entire, barely mucronate; *style 3-cleft; bristles longer than the unequally triangular-obovate very smooth long-pointed achene.* — Borders of ponds, brackish and fresh, N. Eng. to Penn., Mich., and Minn.

7. **S. Olnèyi,** Gray. *Culm 3-wing-angled, with deeply excavated sides,* stout (2 – 7° high), the *upper sheath bearing a short triangular leaf or none;* spikelets 6 – 12, closely capitate, ovoid, obtuse, overtopped by the short involucral leaf; scales orbicular, smooth, the inconspicuous mucronate point shorter than the scarious apex; *anthers with a very short and blunt minutely bearded tip; style 2-cleft;* bristles 6, scarcely equalling the narrowly obovate plano-convex and mucronate achene. — Salt marshes, S. New Eng. to Fla., west to the Pacific.

**S.** MUCRONÀTUS, L. Resembling the last, 1 – 3° high; spikelets numerous in a dense cluster, oblong-ovate, 6 – 8″ long or less; scales ovate, mucronate.

firm, scarcely at all scarious; *style 3-cleft;* achene smaller, broadly obovate. — In a single locality in Delaware Co., Penn.; probably introduced from S. Europe.

+ + *Culm triangular, tall and stout, from slender running rootstocks; spikelets many-flowered, loosely umbellate or corymbed, involucellate-bracted.*

8. **S. Cánbyi,** Gray. Culm (3 – 5° high) 3-angled, usually sharply so above, obtusely below, the sheath at base extended into a long slender triangular and channelled leaf (2 – 4° long); involucral leaf similar (4 – 8′ long), continuing the culm; spikelets oblong (4 – 6″ long), single or sometimes proliferously 2 or 3 together, nodding on the apex of the 5 – 9 long filiform and flattened peduncles or rays of the dichotomous umbel-like corymb, or the central one nearly sessile; scales loosely imbricated, oblong-ovate, acute, pale, thin and scarious, with a greenish nerved back; bristles 6, firm, furnished above with spreading hairs rather than barbs, equalling the slender abrupt beak of the obovate-triangular shining achene (1½″ long). — In a pond near Salisbury, Md.

+ + + *Culm terete, very tall and stout, from a deep running rootstock, leafless or very nearly so; spikelets numerous, clustered in a one-sided compound umbel-like panicle longer than the involucral leaf; involucellate bracts small, scale-like and rusty-scarious; scales of the spikelets rusty or chestnut-brown, scarious, the midrib extended into a mucronate point.*

9. **S. lacústris,** L. (Great Bulrush.) Culm 3 – 9° high, ½ – 1′ thick at base; spikelets ovate-oblong (3 – 4″ long); scales mostly a little downy on the back and ciliate; style 2-cleft; achene pale and dull, obovate with a narrowed base, plano-convex, mucronate-pointed, usually overtopped by the 4 – 6 slender downwardly barbed bristles. (S. validus, *Vahl.*) — Common everywhere in still fresh water. (Eu., Asia, etc.)

+ + + + *Culms slender from an annual root, terete, plano-convex or obtusely triangular, naked; the sheaths rarely bearing a short leaf; spikelets few or several in a sessile cluster, sometimes solitary, much overtopped by the involucral leaf; bristles often few or wanting.*

10. **S. débilis,** Pursh. (Pl. 3, fig. 1 – 5.) *Culms obtusely triangular,* with somewhat hollowed sides, 1 – 2° high, yellowish-green, shining; spikelets 3 – 12, capitate, ovate-oblong, obtuse (3 – 4″ long), chestnut-brown; involucral leaf often horizontal at maturity; scales roundish; stamens 3; style 2 – 3-cleft; *bristles* 6, *stout,* downwardly barbed, equalling or two surpassing the obovate *turgidly plano-convex* (or bluntly 3-sided) abruptly mucronate-pointed *smoothish* achene. — Swamps, Mass. to S. C., Minn. and Neb. Aug., Sept.

11. **S. Smíthii,** Gray. *Culms terete,* slender, 3 – 12′ high, often leaf-bearing from the upper sheath, dull green as are the 1 – 3 oblong-ovate acute spikelets; involucral leaf always erect; scales oblong-oval; style 2-cleft; *bristles* 1 *or* 2 *minute rudiments or none;* achene *somewhat lenticular, smooth,* deciduous with the scales. — Wet shores, Delaware Bay to L. Ontario, Mich., N. Ind., and Ill. July.

12. **S. supìnus,** L., var. **Hállii,** Gray. *Culms filiform,* 5 – 12′ high; upper sheath rarely distinctly leaf-bearing; spikelets 1 – 7 in a sessile or sometimes geminately proliferous cluster, ovate-oblong becoming cylindrical, green

ish; scales ovate, strongly keeled, mucronate-pointed; stamens 2 or 3; style 2-cleft; *bristles none; achene obovate-orbicular*, mucronate, plano-convex, *strongly wrinkled transversely.* — Wet shores, Ill. to Tex.; also found in E. Mass. (*Hitchings*). (Eu.)

* * * *Spikelets in simple or mostly compound umbellate or cymose-panicled clusters, many-flowered, terete; involucre of mostly several flat leaves; culm tall, from tufted or running rootstocks, triangular, leafy, sedge-like: leaves rough on the margin; style mostly 3-cleft.*

+ *Spikelets large* (6 – 15″ *long*); *midrib of the scales extended beyond the mostly lacerate or two-cleft apex into a distinct awn.*

13. **S. marítimus**, L. (SEA CLUB-RUSH.) Leaves flat, linear, as long as the stout culm (1 – 3° high), those of the involucre 1 – 4, very unequal; spikelets few – several in a sessile cluster, and often also with 1 – 4 unequal rays bearing 1 – 7 ovate or oblong-cylindrical (rusty-brown) spikelets; awns of the scales soon recurved; *achene obovate-orbicular, compressed, flat on one side, convex or obtuse-angled on the other, minutely pointed, shining, shorter than the* 1 – 6 unequal and deciduous (sometimes obsolete) *bristles.* — Saline localities, on the coast from N. Scotia to Fla., and in the interior across the continent. (Eu.) — Var. MACROSTÁCHYOS, Michx.; larger, with very thick oblong-cylindrical heads (1 – 1½′ long), and longer involucral leaf (often 1° long).

14. **S. fluviátilis**, Gray. (RIVER C.) Culm very stout, 3 – 5° high; leaves flat, broadly linear (½′ wide or more), tapering gradually to a point, the upper and those of the very long involucre very much exceeding the *compound umbel; rays* 5 – 9, *elongated, recurved-spreading*, each bearing 1 – 5 ovate or oblong-cylindrical acute paler heads; scales less lacerate and awns less recurved; *achene obovate, sharply and exactly triangular, conspicuously pointed, opaque*, scarcely equalling the 6 rigid bristles. — Borders of lakes and large streams, W. Vt. to Conn. and Penn., west to Minn. and Iowa.

+ + *Spikelets very numerous, small* (1 – 3″ *long*); *scales mucronate-pointed or blunt; umbel-like cymose panicle irregular, compound or decompound; culm* 2 – 5° *high, unusually leafy; leaves broadly linear, green and rather soft: bristles very slender, often more or less tortuous and naked below.*

15. **S. sylváticus**, L. *Spikelets lead-colored, clustered* 3 – 10 *together at the end of the mostly slender ultimate divisions* of the open decompound panicle, ovoid or lance-ovate, 2″ long; scales bluntish; bristles 6, downwardly barbed throughout, rather exceeding the triangular short-pointed achene; style 3-cleft. — Along brooks, E. Mass. to N. Y. and E. Penn.

Var. **dígynus**, Boeckl. Style 2-cleft and the achene not at all angled on the back; stamens 2, and bristles 4. (S. microcarpus, *Presl.*) — N. Scotia and N. Eng. to Minn., and westward.

16. **S. atròvirens**, Muhl. Leaves somewhat more rigid; *spikelets dull greenish-brown, densely conglomerate* (10 – 30 *together*) *into close heads*, these also usually densely clustered in a less compound panicle; scales pointed; *bristles* sparsely and strongly *downwardly barbed above the middle, naked below*, nearly straight, as long as the conspicuously pointed and obovate-oblong triangular achene. — Wet meadows and bogs, N. Scotia and N. Eng., west to Minn., Kan., and the Pacific.

17. **S. polyphýllus,** Vahl. Culm usually more leafy; *spikelets yellow-brown,* ovate, becoming cylindrical, *clustered* 3 – 8 *together in small heads on* the short ultimate divisions of the *open decompound umbel;* scales mucronate; *bristles* 6, *usually twice bent, soft-barbed toward the summit only,* about twice the length of the achene. — Swamps and borders of ponds, western N. Eng. to N. C., west to Minn. and Ark.

## 9. ERIÓPHORUM, L. COTTON-GRASS. (Pl. 3.)

Bristles naked, usually very numerous, often silky and becoming greatly elongated. Otherwise as in Scirpus. — Spikelets single or clustered or umbellate, usually involucrate with erect scale-like bracts, upon a leafy or naked stem; scales membranaceous, 1 – 3-nerved. Style very slender and elongated, 3-cleft. Achene acutely triangular. (Name composed of ἔριον, *wool* or *cotton,* and φορός, *bearing.*)

* *Bristles* 6, *rust-colored, becoming tortuous and entangled; culm very leafy, bearing numerous spikelets in an involucrate decompound cymose-panicled umbel.*

1. **E. lineàtum,** Benth. & Hook. Culm triangular, leafy (1 – 3° high); leaves linear, flat, rather broad, rough on the margins; umbels terminal and sometimes axillary, loose, drooping, the terminal with a 1 – 3-leaved *involucre much shorter than the long slender rays;* spikelets oblong, becoming cylindrical (2 – 4″ long), on thread-like drooping pedicels; *bristles at maturity scarcely exceeding the* ovate green-keeled *pointed scales;* achene sharp-pointed. (Scirpus lineatus, *Michx.*) — Low grounds, western N. Eng. to Ga., west to Minn. and Mo.

2. **E. cyperìnum,** L. (Pl. 3, fig. 6 – 10, under Scirpus.) (WOOL-GRASS.) Culm nearly terete (2 – 5° high); leaves narrowly linear, long, rigid, those of the *involucre* 3 – 5, *longer than the umbel,* the rays at length drooping; spikelets exceedingly numerous, ovate, clustered, or the lateral pedicelled, woolly at maturity ($1\frac{1}{2}$ – 3″ long); the rust-colored *bristles much longer than the pointless scales;* achene short-pointed. (Scirpus Eriophorum, *Michx.*) — Wet meadows and swamps, Newf. to Fla., west to Minn. and Iowa. Exceedingly variable in the character and size of the umbel, the typical form having the spikelets mostly clustered in small heads. — Var. LÁXUM has the spikelets scattered, the lateral long-pedicelled.

* * *Bristles* 6, *crisped, white; spikelet single, small; involucre of one short bract.*

3. **E. alpìnum,** L. (Pl. 3, fig. 1 – 6.) Culms slender, many in a row from a running rootstock (6 – 10′ high), scabrous, naked; sheaths at the base awl-tipped. — Cold bogs, Lab. to N. Eng., west to Minn. June. (Eu.)

* * * *Bristles very numerous, not crisped, forming dense cottony heads in fruit.*

+ *Culm bearing a single spikelet; involucre none.*

4. **E. vaginàtum,** L. Culms in close tufts (1° high), leafy only at the base, above with 2 inflated leafless sheaths; root-leaves long and thread-form, triangular-channelled; scales of the ovate spikelet long-pointed, lead-color at maturity. — Cold and high peat-bogs, N. Eng. to Penn., Mich., Minn., and northward. May, June. (Eu.)

+- +- *Culm leafy, bearing several umbellate-clustered heads, involucrate.*

5. **E. Virgínicum,** L. Culm rigid (2–4° high); leaves very narrowly linear, elongated, flat; *spikelets nearly sessile, crowded in a dense cluster or head; wool rusty or copper-color,* only thrice the length of the scale; stamen 1. — Bogs and low meadows, Newf. to Fla., west to Minn. and Neb. July, Aug. — Var. ALBUM, Gray, has the wool white. N. New York.

6. **E. polystáchyon,** L. Culm rigid (1–2° high), obscurely triangular; *leaves linear, flat, or barely channelled below,* triangular at the point; *involucre 2–3-leaved;* spikelets several (4–12), on smooth nodding peduncles, some of them elongated in fruit; achene obovate; *wool white,* very straight (1′ long or more). — Bogs, Newf. to Ga., Minn., and westward. June, July. (Eu.) — Var. LATIFÒLIUM, Gray; peduncles rough; leaves sometimes broader and flatter.

7. **E. grácile,** Koch. Culm slender (1–2° high), rather triangular; *leaves slender, channelled-triangular,* rough on the angles; *involucre short and scale-like, mostly 1-leaved;* peduncles rough or roughish-pubescent; spikelets 3–7, small, when mature the copious white wool 6–9″ long; achene elliptical-linear. — Cold bogs, Newf. to N. J., west to Minn. and Mo. Scales in our plant mostly light chestnut and about 3-nerved. June–Aug. (Eu.)

### 10. FUIRÈNA, Rottboell. UMBRELLA-GRASS. (Pl. 2.)

Spikelets many-flowered, terete, clustered or solitary, axillary and terminal. Scales imbricated in many ranks, awned below the apex, all floriferous. Perianth of 3 ovate or heart-shaped petaloid scales, mostly on claws, and usually with as many alternating small bristles. Stamens 3. Style 3-cleft. Achene triangular, pointed with the persistent base of the style. Culms from a perennial root, obtusely triangular. (Named for *G. Fuiren*, a Danish botanist.)

1. **F. squarròsa,** Michx., var. **híspida,** Chapm. (Pl. 2, fig. 1–7.) Stem (1–3° high) leafy; leaves and sheaths usually densely hairy; spikelets ovoid-oblong (4–6″ long), clustered in heads, bristly with the spreading awns of the scales; perianth-scales rhombic or deltoid-ovate, with a short thick awn or point, the interposed mostly barbed bristles shorter than the achene. — Sandy wet places, N. J. to Fla., west to Ky. and Tex.

Var. **pùmila,** Torr. Usually low (1–6′ high or more), with 1–6 spikelets; perianth-scales narrowly to broadly oblong or ovate, long-stipitate and attenuate to a long awn; barbed bristles usually exceeding the achene. — Mass. to N. J., Fla., and La.; Mich. The commonest form.

### 11. HEMICÁRPHA, Nees. (Pl. 2.)

Spikelet, flowers, etc., as in Scirpus, except that there is a minute translucent scale (readily overlooked) between the flower and the axis of the spikelet. Stamen only one. Style 2-cleft. Bristles or other perianth none. (Name from ἥμι, *half*, and κάρφος, *straw* or *chaff*, in allusion to the single inner scalelet.)

1. **H. subsquarròsa,** Nees. Dwarf or minute annual (1–5′ high); involucre 1-leaved, as if a continuation of the bristle-like culm, and usually with another minute leaf; spikelets 2–3 (barely 2″ long); scales brown, tipped with a short recurved point. — Sandy borders of ponds and rivers, N Eng. to Fla., west to the Pacific.

## 12. LIPOCÁRPHA, R. Br. (Pl. 2.)

Spikelets terete, many-flowered, in a terminal close cluster involucrate by leafy bracts. Scales spatulate, regularly imbricated all round in many ranks, awnless, deciduous, a few of the lowest empty. Inner scales (bractlets) 2 to each flower, thin, one between the scale of the spikelet and the flower, one between the latter and the axis of the spikelet. Bristles or other perianth none. Stamens 1 or 2. Style 2-3-cleft. Achene flattish or triangular, naked at the tip. — Culms leafy at base. (Name formed of λίπος, *fat*, and κάρφος, *chaff*, from the thickness of the inner scales of some species.)

1. **L. maculàta,** Torr. Annual; culm (4-8′ high) much longer than the linear concave leaves; spikelets (1-2″ long) green and dark-spotted; inner scales delicate; stamen one; achene oblong with a contracted base. — Springy or miry places, Va. to Fla.; near Philadelphia, probably adventive.

## 13. RHYNCHÓSPORA, Vahl. Beak-Rush. (Pl. 4.)

Spikelets panicled or variously clustered, ovate, globular, or spindle-shaped, terete, or sometimes flattish; but the scales open or barely concave (not boat-shaped nor keeled); the lower commonly loosely imbricated and empty, the uppermost often subtending imperfect flowers. Perianth in the form of bristles (mostly 6). Stamens mostly 3. Achene lenticular, globular, or flat, crowned with a conspicuous tubercle or beak consisting of the persistent indurated base or even of the greater part of the style. — Chiefly perennials, with more or less triangular and leafy culms; the spikelets in terminal and axillary clusters; flowering in summer. (Name composed of ῥύγχος, *a snout*, and σπορά, *a seed*, from the beaked achene.)

§ 1. RHYNCHOSPORA proper. *Spikelets terete or biconvex, few-many-flowered; style conspicuously 2-cleft, its base only forming the tubercle of the mostly lenticular achene; bristles usually present, merely rough or barbed-denticulate (not plumose).*

* *Achene transversely wrinkled; bristles mostly 6, upwardly denticulate.*

1. **R. cymòsa,** Nutt. *Culm triangular; leaves linear* (¼′ wide); cymes corymbose, the *spikelets crowded and clustered; achene round-obovate,* twice the length of the bristles, four times the length of the depressed-conical tubercle. — Low grounds, Penn. and N. J. to Fla., west to N. Ind. and Ill.

2. **R. Torreyàna,** Gray. (Pl. 4, figs. 1-5.) *Culm nearly terete, slender; leaves bristle-form;* cymes panicled, somewhat loose, the *spikelets mostly pedicelled; achene oblong-obovate,* longer than the bristles, thrice the length of the broad compressed-conical tubercle. — Swamps; pine-barrens of N. J. to S. C.

3. **R. inexpánsa,** Vahl. *Culm triangular,* slender; *leaves narrowly linear; spikelets spindle-shaped, mostly pedicelled, in drooping panicles; achene oblong,* half the length of the slender bristles, twice the length of the triangular-subulate tubercle. — Low grounds, Va. to Ga.

* * *Achene smooth and even.*

+ *Bristles 6, long and conspicuous, upwardly denticulate.*

4. **R. fúsca,** Roem. & Schultes. Culm 6-12′ high; *leaves bristle-form channelled;* spikelets ovate-oblong, few, clustered in 1-3 loose heads (dark

chestnut-color); *achene obovate, half the length of the bristles*, equalling the triangular-sword-shaped acute tubercle, which is rough-serrulate on the margins. — Low grounds, N. Brunswick to N. J., west to L. Superior. (Eu.)

5. **R. gracilénta,** Gray. Culms very slender, 1 – 2° high; *leaves narrowly linear;* spikelets ovoid, in 2 – 4 small clusters, the lateral long-peduncled; *achene ovoid, rather shorter than the bristles*, about the length of the flat awl-shaped tubercle. — Low grounds, southern N. Y. and N. J. to Fla.

6. **R. oligántha,** Gray. Culm and leaves filiform, 6 – 12′ high; spikelets very few (1 – 4), ovate-oblong; bristles plumose below the middle; achene obovate-oblong, bearing a conical tubercle ⅓ its length. — Del. (*Canby*) to Fla.

+ + *Bristles none, or* 1 – 3 *and minute; spikelets pale,* 1*-flowered.*

7. **R. pállida,** M. A. Curtis. Culm (1 – 2° high) acutely triangular; leaves and spikelets as in the next species, but only a terminal dense cluster, which is less white or turns pale reddish-tawny; achene obovate-lenticular, tipped with a minute depressed and apiculate tubercle; the delicate bristles 4 – 5 times shorter or obsolete. — Bogs in pine-barrens of N. J. and N. C.

+ + + *Bristles long, denticulate downward, or both ways in* n. 11.

++ *Spikelets white or whitish, becoming tawny with age, perfecting only a single flower; stamens usually* 2; *bristles* 9 – 12, *or even* 20.

8. **R. álba,** Vahl. Culm slender (1 – 2° high), triangular above; leaves narrowly linear or almost bristle-form; spikelets lanceolate, densely crowded in a head-like terminal corymb and usually one or two lateral ones; achene oblong-obovate with a narrowed base, scarcely longer than the flattened-awl-shaped tubercle, shorter than the bristles. — Bogs, Newf. to Fla., west to N. Ind., Minn., and Oregon. (Eu.)

++ ++ *Spikelets chestnut-colored or darker in* n. 10 *and* 11, *few – several-flowered; stamens* 3; *bristles usually* 6.

9. **R. capillàcea,** Torr. Culm 6 – 9′ high, slender; *leaves bristle-form; spikelets* 3 – 6 *in a terminal cluster*, and commonly 1 or 2 on a remote axillary peduncle, *oblong-lanceolate* (pale chestnut-color, 3″ long); *achene oblong-ovoid*, stipitate, very obscurely wrinkled, about *half the length of the* (6, rarely 12) *stout bristles*, and twice the length of the lanceolate-beaked tubercle. — Bogs and rocky river-banks, N. Vt. to Penn., west to western N. Y. and Minn. — Var. LEVISÈTA, Hill. Bristles perfectly smooth. N. W. Ind.

10. **R. Knieskérnii,** Carey. Culm 6 – 18′ high, slender; *leaves narrowly linear*, short; *spikelets numerous, crowded in* 4 – 6 *distant clusters, oblong-ovate* (scarcely 1″ long); *achene obovate*, narrowed at base, *equalling the bristles*, twice the length of the triangular flattened tubercle. — Pine-barrens of N. J. (on bog iron ore exclusively) to Va.; rare.

11. **R. glomeràta,** Vahl. Culm 1 – 3° high; *leaves linear, flat; spikelets numerous in distant clusters or heads* (often in pairs from the same sheath), *ovoid-oblong;* achene obovate, margined, narrowed at base, as long as the lance-awl-shaped flattened tubercle, which equals the always *downwardly barbed bristles.* — Low grounds, N. Eng. to Fla., west to Mich. and N. Ind.

12. **R. cephalántha,** Gray. Culm stout (2 – 3° high); *leaves narrowly linear, flat, keeled; spikelets very numerous, crowded in* 2 *or* 3 *or more dense globular heads* which are distant (and often in pairs), *oblong-lanceolate*, dark

brown; achene orbicular-obovate, margined, narrowed at base, about as long as the awl-shaped beak; *bristles* twice longer, stout, *barbed downward and sometimes also upward.* — Sandy swamps, Long Island to N. J. and Fla.

§ 2. CERATOSCHŒNUS. *Spikelets lanceolate, acuminate, in fruit flattish, cymose-panicled, of only one perfect and* 1 – 4 *staminate flowers; scales few; bristles rigid, minutely scabrous upward; style simple or barely* 2*-toothed, filiform and gradually thickened downward, in fruit persistent as an exserted, slender-awl-shaped, upwardly roughened beak, several times longer than the smooth flat obovate achene; coarse perennials; spikelets in flower* 4″, *in fruit including the projecting beak about* 1′ *long.*

13. **R. corniculàta,** Gray. (HORNED RUSH.) Culm 3 – 6° high; leaves about 6″ wide; *cymes decompound, diffuse; bristles awl-shaped*, stout, unequal, *shorter than the achene.* — Wet places, Penn. to Fla., west to S. Ind. and Mo.

14. **R. macrostàchya,** Torr. (Pl. 4, fig. 1 – 4.) *Cymes* decompound, or in the northern form *somewhat simple* and smaller, and the spikelets usually more clustered; *bristles capillary, twice the length of the achene.* — Borders of ponds, Mass. to N. J. and Fla.; rare.

## 14. CLÀDIUM, P. Browne. TWIG-RUSH. (Pl. 5.)

Spikelets ovoid or oblong, of several loosely imbricated scales; the lower empty, one or two above bearing a staminate or imperfect flower; the terminal flower perfect and fertile. Perianth none. Stamens 2. Style 2 – 3-cleft, deciduous. Achene ovoid or globular, somewhat corky at the summit, or pointed, without any tubercle, in which it differs from Rhynchospora. (Diminutive of *κλάδος, a branch,* from the repeatedly branched cyme of the original species.)

1. **C. mariscoìdes,** Torr. Perennial; culm obscurely triangular (1 – 2° high); leaves narrow, channelled, scarcely rough-margined; cymes small; the spikelets clustered in heads 3 – 8 together on 2 – 4 peduncles; style 3-cleft. — Bogs, N. Scotia to Del., west to S. Minn. and Iowa. July.

## 15. SCLÈRIA, Berg. NUT-RUSH. (Pl. 5.)

Flowers monœcious; the fertile spikelets 1-flowered, usually intermixed with clusters of few-flowered staminate spikelets. Scales loosely imbricated, the lower empty. Stamens 1 – 3. Style 3-cleft. Achene globular, stony, bony, or enamel-like in texture. Bristles, etc., none. Perennials, with triangular leafy culms, mostly from creeping rootstocks; flowering in summer; all in low ground or swamps. Inflorescence, in our species, of terminal and axillary clusters, the lower clusters usually peduncled. (Name, *σκληρία, hardness,* from the indurated fruit.)

* *Achene smooth.*

1. **S. triglomeràta,** Michx. *Culm* (1½ – 3° high) *and broadly linear leaves roughish;* fascicles of spikelets few, the lowest peduncled, the upper *somewhat in threes; achene ovate-globose* or depressed, on an obscure crustaceous disk. — Mass. and Vt. to Fla., west to Minn. and Tex. — Var. GRÁCILIS, Britton. Culms slender (1 – 2° long); fascicles few-flowered, the lower (2 – 3-flowered) on very long filiform peduncles; achene not more than half as large, acutish. — N. J.

2. **S. oligántha,** Ell. Culms slender, 2° high, the angles somewhat winged; *leaves linear* (2″ wide), *smooth* except the scabrous apex; lateral fascicles 1 or 2, usually on long exserted peduncles; *achene ovate, on a tuberculate disk.* — Va. to Fla. and Tex.

* * *Achene papillose or warty.*

3. **S. pauciflòra,** Muhl. Smoothish or hairy; culm slender (9 – 24′ high); leaves narrowly linear; fascicles few-flowered, the lateral pedunculate, sessile, or wanting; bracts ciliate; achene globose-ovate; the disk a narrow ring bearing 3 pairs of minute tubercles. — N. H. to Ohio, south to Fla. and Tex.

* * * *Achene reticulated or wrinkled.*

4. **S. reticulàris,** Michx. (Pl. 5, fig. 6 – 10.) Culms slender, *erect,* scabrous (1 – 2½° high); leaves linear (1 – 1½″ wide), smooth; lateral fascicles 1 – 3, loose, remote, nearly erect, *on short often included peduncles;* bracts glabrous; achene globose, *regularly reticulated and pitted,* not hairy, resting upon a double greenish conspicuously 3-lobed disk, the inner appressed to and deciduous with the achene. — E. Mass. to Fla. — Var. PUBÉSCENS, Britton. Edges of reticulations more or less hairy, especially toward the apex; lateral fascicles generally on longer peduncles. Pine-barrens of N. J. to Fla. — Var. OBSCÙRA, Britton. Achene bony, its surface with very obscure reticulations, nearly smooth at the summit. R. I. and N. C.

5. **S. Torreyàna,** Walpers. Culms weak, *diffuse,* slightly scabrous or smooth; leaves linear (2 – 4″ wide), smooth; lateral fascicles loose, on *more or less elongated and drooping filiform peduncles;* achene *irregularly pitted-reticulated or pitted-rugose with the ridges somewhat spirally arranged and more or less hairy* (sometimes smooth); otherwise as in the last. (S. laxa, *Torr.*) — Pine-barrens, N. J. to Fla. and Tex.

6. **S. verticillàta,** Muhl. Smooth; culms simple, slender (4 – 24′ high); leaves narrowly linear; *fascicles* 3 – 9-flowered, 4 – 6, *sessile in an interrupted spikelet; achene* globose (½″ broad), somewhat triangular at base, *rough-wrinkled with short elevated ridges; disk obsolete.* — E. Mass. to Ont., Minn., and south to the Gulf.

## 16. CÀREX, Ruppius. SEDGE. (By L. H. BAILEY.)

Flowers unisexual, destitute of floral envelopes, disposed in spikes; the staminate consisting of three stamens, in the axil of a bract, or *scale;* the pistillate comprising a single pistil with a bifid or trifid style, forming in fruit a hard lenticular or triangular achene, which is enclosed in a sac (*perigynium*) formed by the complete union of the borders of a bractlet or of connate bractlets and borne in the axil of a bract, or *scale.* Staminate and pistillate flowers borne in different parts of the spike (spike *androgynous*), or in separate spikes on the same culm, or rarely the plant diœcious. — Perennial grass-like herbs with mostly triangular culms, 3-ranked leaves, usually with rough margins and keel, and spikes in the axils of leafy or scale-like bracts, often aggregated into heads. An exceedingly critical genus, the study of which should be attempted only with complete and fully mature specimens. (The classical Latin name, of obscure signification; derived by some from *κείρω, to cut,* on account of the sharp leaves — as the English name *Shear-grass.*) (Pl. 5 and 6.)

### Synopsis of Sections and Groups.

§ 1. CAREX proper. Staminate flowers forming one or more terminal linear or club-shaped spikes (often pistillate at base or apex). Pistillate flowers usually in distinct and simple mostly peduncled spikes. Cross-section of perigynium circular, obtusely angled, or prominently triangular in outline. Style mostly 3-parted and achene triangular or triquetrous.

* 1. **Physocarpæ.** Perigynium mostly straw-colored at maturity, papery in texture, usually more or less inflated, smooth (sometimes hairy in n. 6), nerved, tapering into a beak as long as or longer than the body; spikes few to many, distinct, compactly flowered; stigmas 3 (2 in n. 10).

+ 1. *Pauciflorœ.* Perigynium greenish, linear-lanceolate or almost needle shaped, not inflated, strongly deflexed at maturity, several times longer than the inconspicuous scale; spike androgynous, the pistillate flowers at base, few. — Sp. 1.

+ 2. *Lupulinœ.* Perigynium green or greenish-tawny or sometimes yellow, more or less inflated (except in n. 2-4), long, usually very turgid at base, mostly erect or nearly so, very gradually attenuate to a long slenderly toothed beak exceeding the scale; spikes 3 or more, the staminate mostly 1 and stalked, the pistillate often sessile, usually short and thick, often becoming dark colored in drying. — Sp. 2-8.

+ 3. *Vesicariœ.* Perigynium smooth and shining, much inflated, at maturity straw-colored or sometimes purple, beaked and conspicuously short-toothed (entire in n. 10), usually prominently few-nerved, much shorter than in + 2; staminate spikes commonly 2 or more; pistillate spikes as a rule long and densely cylindrical. — Sp. 9-16.

+ 4. *Pseudocyperœ.* Perigynium less inflated, more conspicuously nerved or even costate, and with more or less setaceous or awned teeth; scale usually awned; spikes mostly nodding or spreading, comose in appearance, greenish, greenish-yellow, or ochroleucous. — Sp. 17-19.

+ 5. *Squarrosœ.* Perigynium obconic or obovoid, squarrose in exceedingly dense short spikes. — Sp. 20, 21.

* 2. **Trachychlænæ.** Perigynium mostly thick and hard in texture, often scabrous or hirsute, straight-beaked; pistillate spikes compactly flowered, mostly large, erect or nearly so; staminate spikes 1 or more; stigmas 3. Generally large and coarse.

+ 1. *Shortianœ.* Terminal spike androgynous, staminate below; perigynium small, scabrous, nearly beakless, entire. — Sp. 22.

+ 2. *Anomalœ.* Terminal spike all staminate; pistillate spikes long and cylindrical, mostly dense; perigynium broad and short, short-beaked, the orifice very slightly notched or entire, mostly granulate. — Sp. 23.

+ 3. *Hirtœ.* A heterogeneous group, distinguished from + 2 by the longer and more deeply cut beak (slightly toothed in n. 24), and by the hairy perigynium (smooth in n. 25). — Sp. 24-27.

+ 4. *Paludosœ.* Staminate spikes 2 or more, long-stalked; the pistillate 2-several, usually all peduncled, long and heavy, loose-flowered, erect or nodding; perigynium large, thick in texture, strongly nerved, mostly smooth, usually conspicuously beaked. Coarse species. — Sp. 28, 29.

* 3. **Microrhynchæ.** Parallel with * 2; distinguished in general by the much smaller and nearly or entirely beakless and mostly entire-mouthed perigynium, which is much thinner in texture; stigmas 2 or 3. Paludose and alpine species, of various habit, mostly with colored spikes, often in dense tufts or tussocks.

+ 1. *Atratœ.* Terminal spike club-shaped and androgynous with the staminate flowers below (very rarely all staminate in n. 32); pistillate spikes mostly short and dark-colored, erect or drooping; stigmas 3. — Sp. 30-32.

+ 2. *Rigidœ.* Mostly stiff, with short erect closely flowered spikes, an entirely staminate terminal spike, dark colored scales, and bracts with purple or black auricles at base; stigmas 2 or 3. — Sp. 33.

+ 3. *Acutœ.* Mostly larger and more slender, usually paludose, with green or light-colored large and long spikes; stigmas 2 (3 in n. 39). Distinguished from + 2 mainly by habit. — Sp. 34-39.

← 4. *Cryptocarpæ.* Large, with nodding or drooping large spikes, their dark scales very long and conspicuous; stigmas 2. — Sp. 40, 41.

← 5. *Pendulinæ.* Distinguished from ← 4 by the smaller size, smaller spikes, sheathless bracts, and whitish, more or less granulated, nearly pointless perigynium; stigmas 3. — Sp. 42 – 45.

* 4. **Hymenochlænæ.** Perigynium mostly light green or whitish, usually thin and membranous, often somewhat inflated or loosely investing the achene, commonly smooth and shining (hairy in n. 46, sometimes in n. 47), slender or oblong, attenuate to a distinct or long minutely toothed straight beak (or beakless or nearly so in ← 1 and n. 55); pistillate spikes several or many, mostly loosely flowered and on filiform nodding or widely spreading peduncles; bracts leaf-like; terminal spike staminate or androgynous; stigmas 3. Mostly rather tall and slender upland species.

← 1. *Virescentes.* Terminal spike pistillate at top; pistillate spikes oblong or cylindrical, dense, erect; perigynium ovate or obovate, nearly or quite beakless, often hairy. — Sp. 46, 47.

← 2. *Sylvaticæ.* Terminal spike all staminate; pistillate spikes mostly long-exserted, slender; perigynium few-nerved, contracted into a cylindrical beak which is longer than the body. — Sp. 48.

← 3. *Flexiles.* Terminal spike all staminate; pistillate spikes rather thick (very small in n. 50), more or less drooping; perigynium beaked, few-nerved or nerveless, tawny or whitish. — Sp. 49, 50.

← 4. *Debiles.* Terminal spike all staminate (occasionally pistillate above in n. 53); pistillate spikes very narrow and slender, long-exserted and nodding, mostly very loosely flowered; perigynium rather small, not turgid, prominently beaked. — Sp. 51 – 53.

← 5. *Gracillimæ.* Terminal spike pistillate at top; pistillate spikes habitually thicker than in ← 4; perigynium ovate-oblong, more or less turgid; the beak short or none. — Sp. 54 – 57.

← 6. *Griseæ.* Terminal spike staminate; perigynium more or less turgid or plump, often glaucous, scarcely beaked, finely striate; spikes erect. — Sp. 58, 59.

* 5. **Spirostachyæ.** Perigynium smooth or minutely granulated or rarely somewhat serrate on the margins, prominently nerved, mostly yellowish, squarrose, mostly beaked (entirely beakless in n. 63), the orifice entire; staminate spike mostly single; pistillate spikes 2 – 5, short (usually 1′ long or less), yellow or fuscous, compactly flowered; stigmas 3. — Medium-sized species, growing in meadows and grassy swales.

← 1. *Granulares.* Spikes scattered, cylindrical, the lowest long-stalked; bracts erect, long and leafy; sheaths short or nearly obsolete. — Sp. 60, 61.

← 2. *Extensæ.* Spikes mostly approximate or aggregated at the top of the culm (becoming remote in C. extensa), the lowest 1 or 2 subtended by a long and leafy mostly abruptly spreading and nearly or entirely sheathless bract. Terminal spike sometimes androgynous. — Sp. 62.

← 3. *Pallescentes.* Spikes globular or short-oblong, obtuse, sessile or short-peduncled, approximate at the top of the culm; bracts short, leaf-like, sheathless; perigynium entire at the orifice, the beak none or very short and stout. — Sp. 63, 64.

* 6. **Dactylostachyæ.** Perigynium mostly short and triangular, mostly with a short and straight or curved beak, green or greenish, scarcely inflated; scales of the pistillate spikes mostly whitish (sometimes dark-colored in the *Digitatæ*), often small; staminate spike mostly one; pistillate spikes short (seldom exceeding 1′), commonly rather loosely flowered and slender (spike single and plant diœcious in n. 83); bracts sheathing, the sheaths often conspicuous and colored. — Low and lax or slender species inhabiting meadows and copses.

← 1. *Oligocarpæ.* Slender and narrow-leaved, with leafy bracts and inconspicuous green sheaths; perigynium rounded on the angles, finely many-striate, often somewhat punctulate as in n. 58, to which the group forms a transition. — Sp. 65 – 67.

← 2. *Laxifloræ.* Slender and more or less broad-leaved, with mostly leafy bracts, green or purple sheaths, and loosely flowered spikes; perigynium mostly conspicuously three-angled, with a more or less curved beak. — Sp. 68 – 74.

+- 3. *Paniceæ.* Mostly stouter and narrow-leaved, with thinner spikes; perigynium often strongly nerved, not conspicuously triangular, often somewhat turgid; bracts and sheaths various. — Sp. 75 - 78.

+- 4. *Bicolores.* Small species with a beakless, more or less round or pyriform perigynium, which is commonly glaucous; terminal spike androgynous or all staminate; stigmas mostly 2. — Sp. 79.

+- 5. *Digitatæ.* Low species; sheaths membranaceous or hyaline and colored, either not prolonged into a bract or the bract very short and not foliaceous; perigynium more or less three-angled, often hairy, the beak straight or nearly so. — Sp. 80 - 83.

* 7. **Sphæridiophoræ.** Perigynium mostly short and rounded, three-angled in the *Triquetræ*, firm or hard in texture, not inflated, hairy or scabrous, the beak straight and usually bifid; staminate spike one; pistillate spikes short (1′ long or less), usually globular or short-oblong, more or less sessile and approximate or the longer ones radical (spike single in n. 84); bracts sheathless, short, or obsolete; stigmas rarely two. — Low species of dry ground, with leaves all radical.

+- 1. *Scirpinæ.* Spike one, unisexual; plant diœcious. — Sp. 84.

+- 2. *Montanæ.* Spikes two to several, the lowest occasionally long-peduncled and radical; perigynium rounded, contracted above and below, mostly bearing two prominent ribs, more or less hairy. — Low species of dry soils. — Sp. 85 - 91.

+- 3. *Triquetræ.* Taller; spikes mostly approximate at the top of the culm, oblong or cylindrical; perigynium conspicuously 3-angled. — Sp. 92.

* 8. **Phyllostachyæ.** Perigynium much as in the *Montanæ;* spike one, staminate above; pistillate flowers few, often remote, usually on a more or less zigzag rhachis; scales prolonged and leaf-like. — Sp. 93 - 95.

* 9. **Leptocephalæ.** Perigynium thin in texture, green, oblong or lanceolate or linear in general outline, beakless; spike one, staminate above, thin and slender; stigmas mostly three. — Small, slender and grass-like. — Sp. 96.

* 10. **Physocephalæ.** Spike one, globular or short-oblong, staminate at the apex; perigynium straw-colored, paper-like, more or less inflated; stigmas three. Leaves remarkably broad in our species. — Sp. 97.

§ 2. VIGNEA. Staminate flowers few and inconspicuous, borne at the base or apex of the pistillate spikes. Pistillate flowers in short sessile spikes (or spike single in some cases), which are commonly more or less aggregated into heads or even panicled. Perigynium plano-convex. Styles two and achene lenticular. — The spikes, especially the uppermost, usually have contracted bases when the staminate flowers are borne below the pistillate ones, and empty scales at the top when the staminate flowers are borne at the summit.

* 11. **Acroarrhenæ.** Staminate flowers borne at the top of the spikes (or, in the *Multifloræ* and *Arenariæ*, spikes often wholly staminate and the plants occasionally diœcious).

+- 1. *Fœtidæ.* Spikes tawny or brown, not elongated, very densely aggregated into a continuous globose somewhat chaffy head; perigynium ovate or ovate-lanceolate, nerveless or nearly so, mostly thin in texture. — Sp. 98, 99.

+- 2. *Vulpinæ.* Spikes mostly yellow or tawny when mature, densely aggregated or sometimes somewhat scattered below or even panicled; perigynium thick in texture, spongy at base, mostly stipitate, bearing very conspicuous nerves, which converge below and are especially prominent on the outer side. — Sp. 100 - 102.

+- 3. *Multifloræ.* Heads various, mostly loosely flowered, sometimes a panicle, yellow or tawny; spikes short (rarely longer than broad), staminate flowers sometimes occupying whole spikes in the middle or at the apex of the head; perigynium mostly small and short and nearly nerveless, or in some species becoming nearly lanceolate and more or less prominently nerved, firm in texture, usually numerous. — Sp. 103 - 108.

+- 4. *Arenariæ.* Spikes longer than in the last section, linear or nearly so, aggregated into short, almost globose heads; perigynium lanceolate or ovate-lanceolate, mostly larger and more delicate in texture; scales awn-pointed or very acute. Staminate flowers variously situated. — (C. arenaria.)

← 5. *Muhlenbergianæ.* Spikes green or nearly so when mature, aggregated or scattered, never in compound heads; perigynium mostly short-ovate, staminate flowers always at the top of the spike. — Sp. 109 - 114.

← 6. *Dioicæ.* Spike commonly one, small; plants small and slender, often diœcious. — Sp. 115 - 117.

* 12. **Hyparrhenæ.** Staminate flowers borne at the base of the spikes (or in n. 124 and 125 variously situated).

← 1. *Elongatæ.* Spikes silvery green or sometimes tawny when mature, distinct, mostly small, perigynium not wing-margined nor conspicuously broadened, mostly nearly flat on the inner surface. — Sp. 118 - 124.

← 2. *Ovales.* Spikes tawny or dark, rather large, sometimes crowded; perigynium with a more or less thin or winged margin, which is mostly incurved at maturity, rendering the perigynium concave inside. — Sp. 125 - 132.

← 3. *Cyperoideæ.* Spikes green, oblong, densely crowded into a short head subtended by two or three leafy bracts which are erect and prolonged from six inches to a foot; perigynium linear-lanceolate, scarcely margined. — Sp. 133.

### Artificial Key.

| | |
|---|---|
| Spike 1, staminate at top; scales of pistillate flowers leaf-like | Sp. 93 - 95 |
| Spike 1, scales not leaf-like. | |
| Usually diœcious; stigma 2 | 115 - 117 |
| Stigmas 3. — Perigynium densely hairy | 84 |
| Spike staminate at base; perigynia squarrose | 21 |
| Spike staminate at top. — Globose; leaves broad | 97 |
| Perigynium nearly linear, beakless | 96 |
| Perigynium long, spindle-shaped | 1 |
| Spikes several or numerous, sessile, spicate or capitate; stigmas 2. | |
| All in a globose or ovoid uninterrupted head. | |
| All staminate above. — Usually green at maturity | 112, 114 |
| Usually yellow or tawny or brown | 98, 99, 104, 105 |
| All staminate below. — Leafy-bracteate | 133 |
| Not leafy-bracteate. — Green | 118 - 120 |
| Usually tawny or brown | 125 - 132 |
| Some or all of the spikes distinct or the head interrupted. | |
| Staminate and pistillate flowers variously disposed, some of the spikes often unisexual. | |
| Head large and long | 108, C. arenaria. |
| Head short or linear | 124, 125 |
| Spikes staminate above | 100 - 114 |
| Spikes staminate below | 118 - 133 |
| Spikes usually more or less pedicelled, the wholly or partially staminate spikes uppermost. | |
| Terminal spike (rarely the 2 or 3 uppermost) staminate only at base. | |
| Stigmas 2 | 34 - 38, 79 |
| Stigmas 3; spikes erect, | |
| Short and squarrose | 20, 21 |
| Not squarrose | 22, 30, 32, 46, 47, 54, 79 |
| Stigmas 3; spikes more or less drooping | 31, 51 - 53, 55 - 57 |
| Terminal spike or spikes staminate. | |
| Stigmas 2. — Spikes spreading or pendulous | 34, 37, 40, 41 |
| Spikes erect or nearly so | 9 - 16, 34 - 41, 85 - 91, 79 |
| Stigmas 3: spikes spreading or drooping. | |
| Perigynium prominently 3-angled | 68 - 74 |
| Perigynium large, thin, much inflated | 9 - 16 |
| Perigynium firmer, not inflated. | |
| Beakless | 42 - 45 |
| Beaked or prominently pointed. — Teeth long, stiff and sharp | 17 - 19 |
| Teeth short and thin, or none | 30, 31, 39, 48 - 53 |

Stigmas 3 ; spikes erect or ascending.

| | |
|---|---|
| Perigynium hairy. — Spikes very large, globose | 6 |
| Spikes very small, sessile or nearly so | 81 – 83, 85 – 92 |
| Spikes cylindrical, heavy | 24 – 28 |
| Perigynium granular-roughened | 28 |
| Perigynium smooth, | |
| Thin and turgid, loosely enclosing the achene. — Beakless | 58, 59 |
| Beaked | 5 – 17 |
| Firm in texture, not inflated, | |
| Long-beaked, deeply toothed | 2 – 4, 26, 28 |
| Less prominently beaked, short-toothed, sharply 3-angled | 69 – 74 |
| Wholly beakless and pointless | 58, 59, 63, 78, 79 |
| Very small, black and shining ; leaves capillary | 80 |
| Culm and leaves thinly pubescent | 64 |
| Perigynium more or less pointed or beaked. | |
| Spikes spreading or drooping | 51 – 53, 68 - 70, 75 |
| Spikes erect | 60 - 62, 65 - 68, 71 – 78 |

* 1. PHYSOCÁRPÆ. — + 1. *Pauciflòræ.*

1. **C. pauciflòra,** Lightf. (Pl. 5, fig. 1 – 16.) Very slender but erect, 6 – 18′ high ; leaves very narrow, much shorter than the culm ; staminate and pistillate flowers 2 – 5 ; perigynium at maturity easily detached. — Cold sphagnum swamps, New Eng. to N. Penn. and Minn. ; local. (Eu.)

* 1. — + 2. *Lupulinæ.*

++ *Teeth of the perigynium strongly reflexed.*

2. **C. subulàta,** Michx. Green, very slender but erect, 6′ – 2° high ; leaves narrow, somewhat shorter than the culm ; bracts leafy, sheathing ; pistillate spikes 2 – 4, scattered, 2 – 6-flowered ; perigynium deflexed. — Deep sphagnum swamps, R. I. to E. Penn., and southward ; very local.

++ ++ *Teeth erect or spreading.*

= *Whole plant yellowish ; perigynium little or not at all inflated.*

3. **C. Michauxiàna,** Boeckl. Slender but stiff and erect, 1 – 2° high ; leaves narrow and firm, shorter than the culm ; spikes 2 – 3, the lowest usually remote and short peduncled, the remainder aggregated and sessile ; staminate spike small, wholly sessile ; perigynium not inflated, erect or spreading, twice longer than the blunt scale. (C. rostrata, *Michx.*) — Bogs and lake-borders, mountains of N. H. and N. Y., and westward to L. Superior ; local.

4. **C. folliculàta,** L. Stout, 2 – 3° high ; leaves very broad and flat, lax ; pistillate spikes 3 – 4, scattered, all but the uppermost prominently peduncled ; staminate spike short-peduncled ; perigynium larger, inflated, the scale awned and nearly as long. — Cold swamps, New Eng. to N. J. and Penn., and west to Mich. ; rather local.

= = *Plant green ; perigynium much inflated.*

5. **C. intuméscens,** Rudge. Slender, 18 – 30′ high ; leaves narrow ; pistillate spikes two, loosely 1 – 8-flowered, the perigynium erect-spreading, not prominently many-nerved. — Wet pastures and swamps ; common.

6. **C. Gràyii,** Carey. Larger and stouter ; leaves broad and flat, 3 – 4″ wide ; pistillate spikes 1 or 2, the lowest often peduncled, perfectly globular and compactly 12 – 30-flowered, the perigynium spreading or deflexed and prominently many-nerved. — Meadows and copses, Vt. to Ill., and south

to Ga.; rare eastward. — In var. HISPÍDULA, Gray, the perigynium is sparsely hispidulous.

7. **C. lupulìna,** Muhl. Very stout and leafy; leaves rather broad and loose; pistillate spikes 2 – 6, approximate at the top of the culm, all closely sessile or the lower sometimes short-peduncled, oblong or short-cylindrical, very heavy and densely flowered; staminate spike small and sessile; perigynium large and rather soft, erect or but slightly spreading, giving the spike a hop-like aspect (whence the name). (C. lurida, *Bailey*.) — Swamps and wet pastures; frequent.

Var. **pedunculàta,** Dewey. Spikes more or less scattered, some or all prominently peduncled; staminate spike usually conspicuous, often long-peduncled, very variable in size; perigynium more spreading. (C. gigantea, *Rudge*.) — With the species, but more common.

Var. **polystàchya,** Schwein. & Torr. Stouter, the leaves very broad (often ½′); bracts broad and far exceeding the culm; pistillate spikes 4 – 6, all long (3 – 4′) and cylindrical, more or less short-peduncled, somewhat scattered, becoming yellow; perigynium very large, ascending. (C. lupuliformis, *Sartw*.) — N. Y. and N. J.; not common.

**C.** LUPULÌNA × RETRÓRSA, Dudley. Distinguished from C. lupulina by its straw-colored perigynium, which is less inflated and more spreading, standing at nearly right angles to the axis of the spike; scales acute to short-awned, rough. (C. lurida × retrorsa, *Bailey*). — Ithaca, N. Y. (*Dudley*), and Lansing, Mich. (*Bailey*). Resembles n. 16.

8. **C. grándis,** Bailey. Distinguished from C. lupulina, var. polystachya, by its much more scattered and mostly shorter slim spikes, which are comparatively loosely flowered; perigynium swollen below but very abruptly contracted into a slender beak 3 – 4 times as long as the body, spreading at right angles or nearly so, never becoming yellow; scales narrow, smooth. (C. gigantea of previous editions.) — Swamps, Ky., Del., and southward; local.

∗ 1. — + 3. *Vesicàriæ.*

++ *Spikes very small, globular or short-oblong.*

9. **C. oligospérma,** Michx. Very slender, but stiff, 18 – 30′ high; leaves and bracts very narrow, becoming involute; staminate spike single, peduncled; pistillate spikes 1 or 2, sessile or the lowest very short-peduncled, 3 – 8-flowered; perigynium turgid, short-ovoid, gradually contracted into a very short and minutely toothed beak, prominently few-nerved, yellow, nearly twice longer than the blunt scale. — Deep swamps and borders of lakes, N. Eng. to Penn. and Minn.; frequent.

10. **C. miliàris,** Michx. Culm very slender but erect, 12 – 18′ high, smooth, or slightly rough above on the angles; leaves almost filiform, mostly shorter than the culm; staminate spikes 1 – 2, exceedingly narrow, elevated an inch or two; pistillate spikes 1 – 3, the upper one sessile and the lowest very short-stalked, 9″ long or less, the lower subtended by a short leafy bract; perigynium very small, broad- or round-ovate or ovate-oblong, thin but firm, bearing a nerve on each side but otherwise nerveless or very nearly so, rounded into a very short terete entire or somewhat erose beak; scales brown, lance-ovate, white tipped, about as long as the perigynium. (C. rotundata? of last ed.) — Outlet of Moosehead Lake, Maine, and northward.

Var. **màjor,** Bailey. Culm much stouter (often over 2° high), thick and very sharply angled; leaves stout and channelled or involute; staminate spikes short-stalked; the pistillate 1 – 5, darker, mostly longer and larger; scale varying from wholly obtuse to acutish. — Outlet of Moosehead Lake (*Porter*), and northward.

Var. (?) **aùrea,** Bailey. Taller and mostly stouter than the type; pistillate spikes one or two, often staminate at top, yellow or stramineous; perigynium longer, gradually produced into a conspicuous and more or less toothed beak, prominently few-nerved, yellow, broader and usually longer than the blunt scale. (C. pulla, and var. miliaris, last ed.) — Outlet of Moosehead Lake (*Smith*), and northward.

*++ ++ Spikes much larger, cylindrical.*

*= Scales all, or all but the very lowest, smooth.*

11. **C. utriculàta,** Boott. Very stout and robust, 3 – 4° high; leaves broad (4 – 6″) and flat, very prominently nodulose, particularly below; spikes 3 – 4, 3 – 6′ long, very thick and dense above but usually more or less attenuate below, erect or nearly so, all but the lowest sessile or very short-stalked; perigynium ovate, only moderately inflated, rather abruptly contracted into a short toothed beak, at maturity usually squarrose, rather prominently few-nerved, the upper longer than the sharp scale, the lower shorter than or only equalling the sharper or awned scale. (C. rostrata, *Bailey*, etc.) — Swamps, everywhere; common. Passes imperceptibly into var. MÌNOR, Boott, which is distinguished by its much smaller size, spikes 2½′ long or less, smaller perigynium, blunt scales, and narrower and little nodulose leaves. With the type.

12. **C. monìle,** Tuckerm. Rather slender but erect, 2 – 3° high, the culm sharply angled and usually rough above; pistillate spikes 2 – 3, the lowest one or two short-stalked, erect or spreading, 1 – 3′ long, narrowly cylindrical; perigynium turgid, prominently beaked, about 10-nerved, ascending, longer than the very sharp scale. (C. Vaseyi, *Dewey*.) — Meadows and swales; common. — In var. MONSTRÒSA, Bailey, the plant is very slender throughout, and the terminal spike more or less pistillate, while the remaining spikes are reduced to one or two which are very small and loosely flowered and usually on very long filiform peduncles. E. Mass. (*Swan*).

13. **C. Tuckermàni,** Dewey. Differs from the last chiefly in the comparatively shorter (1 – 2′ long) spikes, which are much thicker (usually ½′ or more); perigynium greatly inflated and very thin and papery, the body broader than long (about 3″ thick); scale thin and narrow, acute, all but the very lowest less than half the length of the perigynium. — Swamps, W. New Eng. to N. J., and west to Minn.; frequent.

14. **C. bullàta,** Schkuhr. (Pl. 6, fig. 15 – 20.) Slender, 1 – 2° high; culm very sharply and roughly angled, thin but stiff; leaves narrow, rough-edged, stiff; spikes 1 or 2, remote, short and thick (rarely 1½′ long), sessile or the lower short-peduncled, more or less spreading; perigynium turgid but very firm, dull straw colored and shining as if varnished, prominently few-nerved, the long beak usually minutely roughened; scale membranaceous and blunt, about ⅓ as long as the perigynium. — Swamps from E. Mass. to N. J. and E. Penn., and southward; frequent.

**C. BULLÀTA × UTRICULÀTA**, Bailey. Perigynium considerably smaller and more spreading, less shining; scales longer and sharper. (C. Olneyi, *Boott.*) — Providence, R. I. (*Olney*).

15. **C. retrórsa**, Schwein. Stout, 2–3° high; culm obtusely angled and smooth or nearly so; leaves broad and soft, roughish, much longer than the culm; spikes 3–5, approximate near the top of the culm or the lowest remote, all but the lowest 1 or 2 sessile, 1–2′ long and very compactly flowered, erect or spreading; perigynium very thin and papery, much inflated, prominently nerved, strongly reflexed; scale very short and small. — Swamps, from Penn. northward, common. — In var. HÁRTII, Gray, a common monstrous form, the spikes are more or less scattered and peduncled, loosely flowered, and the perigynium less reflexed or spreading.

= = *Scales all rough-awned.*

16. **C. lùrida**, Wahl. Variable in size, mostly ranging from 1½–3° high, stout; culm rather obtusely angled and smooth; leaves long and loose, rough; spikes 2–4, variously disposed, the 1 or 2 upper sessile, nearly erect or often drooping, very densely flowered; perigynium thin and turgid, often somewhat shining, rather lightly about 10-nerved, very long and slenderly beaked, ascending; staminate spike single, scales linear, half as long as the perigynium or more. (C. tentaculata, *Muhl.*) — Swamps, N. Eng. to S. Ill., and southward; abundant eastward. Very variable. — Var. GRÁCILIS, Bailey. Plant more slender; spikes 2–3, very small and narrowly cylindrical (1′ long or less, and 3″ broad or less). Mts. of Vt., Penn., and Tenn.

Var. **fláccida**, Bailey. Lower, scarcely exceeding 12–15′ in height; spikes 2–4, all sessile and approximate at the top of the culm, small and straight (1′ long or less), dull brown or reddish-brown, loosely flowered and entirely lacking the dense and comose appearance of the type; perigynium very thin and much inflated, the body usually larger than in the type and more gradually contracted into the beak. — N. Y. to N. J.; apparently scarce.

**C. LÙRIDA × LUPULÌNA**, Bailey. Very like C. lurida, but the spikes usually all approximate or only the lowest separated, erect or spreading, all sessile, green or greenish, often curved; perigynium very long-beaked and ascending; staminate spike one, sessile or very nearly so, strongly resembling that of C. lupulina. (C. tentaculata, var. altior, *Boott.*) — Mass., Conn., and N. Y.; little known. C. lupulina × retrorsa is distinguished from this by its yellow or straw-colored more scattered spikes which are shorter and always straight, and the loose, larger and more inflated perigynia.

∗ 1. — ← 4. *Pseudocypèreæ.*

↔ *Spikes all erect or ascending.*

17. **C. Schweinítzii**, Dewey. Soft but erect, 1–2° high, stoloniferous, yellowish-green and becoming straw-colored in drying; culm flattish and smooth; leaves broad (3–4″), the radical longer than the culm, the others mostly short; spikes 3–4, the lower one or two short-peduncled, narrowly long-cylindrical (1½–3′ long, 4″ broad); perigynium thin and somewhat inflated, prominently few-nerved, the long beak short-toothed, ascending; scale awned and commonly rough at the tip, a little shorter than the perigynium. — Swamps, W. New Eng. to N. J., and west to Mich.; local.

+- +- *Spikes widely spreading or drooping.*

18. **C. hystricìna,** Muhl. Slender but erect, 1 – 2° high; culm very sharply angled and rough, at least above; leaves rather narrow, roughish; spikes 1 – 3, borne near the top of the culm, the upper one often sessile, the remainder on more or less filiform stalks, short (rarely 1½′ long) and compactly flowered; perigynium greenish, very strongly 15 – 20-nerved, the very slender beak strongly toothed; scale linear and rough-awned, nearly or quite as long as the perigynium. — Swales, throughout; frequent. Often confounded with n. 16.

Var. **Dudlèyi,** Bailey. Taller; spikes larger and slimmer (1½ – 2½′ long), light straw-colored, all secund and widely divaricate or nodding; perigynium stronger toothed; scales usually more prominent. — Swales, Conn. (*Wright*), Ithaca, N. Y. (*Dudley*), Wisc. (*Lapham*).

19. **C. Pseùdo-Cypèrus,** L. Tall and stout, 2 – 3° high; culm thick and very sharply triangular, rough throughout; leaves very long, rough-margined; spikes 3 – 5, all slenderly peduncled and more or less drooping, all somewhat contiguous, long (mostly 2 – 3′) and narrowly cylindrical, very compactly flowered; perigynium elliptic-lanceolate, more or less 2-edged, many-costate, the beak shorter than the body, with erect short teeth, strongly reflexed; scale very rough-awned, about the length of the perigynium. — Swamps and lake-borders, N. Eng. to Penn., and Mich.; rare. (Eu.)

Var. **Americàna,** Hochst. Mostly stouter, the leaves broader (about ¼′); spikes thicker and commonly more drooping; perigynium longer, the beak mostly longer than the body and the teeth long and prominently spreading. (C. comosa, *Boott.*) — Swamps; common.

* 1. — +- 5. *Squarròsæ.*

20. **C. stenólepis,** Torr. Stout and very leafy, 1 – 2° high; culm obtusely angled, very smooth; leaves about 3″ broad, rough on the nerves, the upper and the bracts very much longer than the culm; terminal spike often pistillate at top; other spikes 3 – 5, the uppermost sessile on the zigzag rhachis, short (1 – 1½′ or less) and evenly cylindrical, often staminate at top; perigynium very abruptly contracted into a short but slender toothed beak, shorter than the long-linear and rough scale. — Swamps and meadows, central Penn., to N. Ohio, west and southward; frequent.

21. **C. squarròsa,** L. Cespitose, 2 – 3° high; culm sharply angled, more or less rough above; leaves broad and weak, roughish, exceeding the culm; bracts much less prominent than in the last; spikes 1 – 3, thick, the terminal always two thirds pistillate or more, the remainder more or less stalked, erect or slightly nodding, globular or oblong-cylindric, brown, exceedingly densely flowered; perigynium larger, the beak rough; scale short and usually invisible. — Bogs, throughout; infrequent.

* 2. TRACHYCHLÆNÆ. — +- 1. *Shortiànæ.*

22. **C. Shortiàna,** Dewey. Tall and slender but strict, in small clumps, 2 – 3° high; leaves about ¼′ broad, flat, rough on the nerves; spikes 3 – 5, somewhat approximate near the top of the culm, the lowest 2 or 3 short-peduncled, erect, small (1′ long or less, and 2″ wide), evenly cylindrical, exceedingly densely flowered; perigynium small, circular or round-ovate, flat,

sharp-edged, nerveless, the orifice entire, perfectly squarrose; scale thin and blunt, about the length of the perigynium. — Wet meadows, S. Penn. and Va. to Ill.; rare eastward.

∗ 2. — ← 2. *Anómalæ.*

23. **C. scabràta,** Schwein. Tall and rather stout, very leafy, 1 – 3° high, culm sharply and very roughly angled; leaves broad and flat, very rough; spikes 3 – 5, scattered, the upper 1 or 2 sessile, the remainder often long-peduncled and sometimes nodding, 1 – 2′ long, narrowly cylindrical and compactly flowered; perigynium broadly ovate, prominently few-nerved, rough, the beak nearly as long as the body and slightly toothed; scale acute and rough-tipped, green-nerved, about as long as the body of the perigynium. — Wet meadows and glades, as far west as Mich.; common eastward.

∗ 2. — ← 3. *Hirtæ.*

24. **C. vestìta,** Willd. Stout and stiff, 2 – 3° high; culm sharply angled, smooth or somewhat rough; leaves narrow and rather short, roughish; staminate spike 1, rarely 2, sessile or nearly so; pistillate spikes 2 – 5, approximate and sessile, or rarely the lowest sub-radical, often staminate at top, oblong or short-cylindric (rarely 1′ long), compactly flowered; perigynium ovate, nerved, stiffly hairy, short-beaked, the beak often purple, and white-hyaline at the orifice, which becomes more or less split with age; scale thin and blunt or acute, shorter than the perigynium. — Tufted in sandy soils, from N. Eng. to N. Y., and southward; frequent.

25. **C. strìata,** Michx., var. **brèvis,** Bailey. Stiff, 1½ – 2½° high; culm sharply angled, smooth or slightly rough above, mostly exceeding the leaves; leaves narrow and stiff, becoming involute; spikes 1 – 2, mostly closely sessile, considerably separated when two, short (rarely 1½′ long) and rather thick, erect; perigynium broad-ovate with impressed nerves, smooth, ascending, short-beaked and very short-toothed; scale thin, obtuse or acutish, mostly about ½ as long as the perigynium. — Pine-barren swamps, N. J., and southward; local.

26. **C. Houghtònii,** Torr. Stiff, 1 – 2° high, extensively creeping; culm rather sharply angled, rough, exceeding the leaves; leaves flat and very sharp-pointed; spikes 1 – 3, sessile or the lowest short-stalked, erect, varying from nearly globular to cylindric (1½′ long), compact; perigynium short-ovate, stiffly pubescent, prominently nerved and toothed; scale thin-margined, acute or awned, shorter than the perigynium. — Sandy knolls and banks from Maine to Minn. along our northern borders, and northwestward; rather local.

27. **C. filifórmis,** L. Tall and very slender but erect, 2 – 3° high; culm obtuse, smooth; leaves very long, involute-filiform, rough; spikes 1 – 3, sessile, somewhat scattered, erect, short and thick (rarely over 1′ long); perigynium very short-ovate, the teeth very short, the few nerves obscured by the dense stiff hairs; scale thin and blunt, about as long as the perigynium. — Bogs, throughout, north of Penn.; frequent. (Eu.)

Var. **latifòlia,** Boeckl. Culm mostly rough above; leaves flat, 1 – 2″ broad; spikes usually somewhat slimmer and scales often sharper and longer. (C. lanuginosa, *Michx.*) — Swales and low meadows, throughout; common.

**C.** HÍRTA, L. Variable in size (½ – 2° high), widely creeping; culm rather slender but erect, obtuse and smooth or slightly rough above; leaves soft and flat, generally sparsely hairy and the sheaths very hirsute, rarely smooth; spikes 2 – 3, distant, more or less shortly-peduncled, erect or nearly so, 1½′ long or less and rather loose; perigynium long-ovate, nerved, soft-hairy, the prominent beak slenderly toothed; scale thin and green-nerved, awned, mostly a little shorter. — E. Mass. to central N. Y. and Penn. (Nat. from Eu.)

∗ 2. — ⊹ 4. *Paludòsæ.*

⊹⊹ *Teeth slender, mostly spreading.*

28. **C. trichocárpa,** Muhl. Stout and tall, 2 – 3° high; culm sharply angled, rough above; leaves very numerous, flat and very rough, but not hairy, much exceeding the culm; spikes 2 – 5, scattered, the lower stalked and more or less spreading, long and heavy (1 – 4′) but loosely flowered at base; perigynium long-ovate, many-costate, sparsely short-hairy, about twice as long as the membranaceous, acute or acuminate scale. — Marshes; frequent. — Var. IMBÉRBIS, Gray. Mostly smaller throughout; perigynium smooth; scales usually sharper and longer. Drier places, N. Y. to Mo.; infrequent.

Var. **Dewèyi,** Bailey. Leaves narrower, often becoming somewhat involute, smoother; spikes short (seldom over 1½′ long), all but the lowest one sessile; perigynium smooth, thick in texture, becoming polished with age, the nerves impressed; scales sharp, mostly a little shorter than the perigynium. — Dakota (*Seymour*), and northwestward. Resembles small forms of n. 29.

Var. **aristàta,** Bailey. Mostly stouter; leaves more or less hairy on the under surface and sheaths; perigynium usually longer, smooth, the teeth longer and more spreading. (C. aristata, *R. Br.*) — N. Eng. to Minn.; rare eastward.

⊹⊹ ⊹⊹ *Teeth short, erect or very nearly so.*

29. **C. ripària,** W. Curtis. Very large and stout, 2 – 4° high, stoloniferous; leaves mostly broad, flat, rough, glaucous, much longer than the sharply angled culm; spikes 2 – 4, scattered and all more or less peduncled, the lowest often very long-stalked, varying from almost globular in starved plants to 3 – 4′ long, erect or the lower somewhat drooping, loosely flowered below; perigynium ovate-lanceolate, coriaceous, rather lightly many-nerved, becoming polished, the beak short and thick; scale varying from blunt to awned, shorter or longer than the perigynium. — Swales; common. (Eu.)

**C.** ACUTIFÓRMIS, Ehrh. Stout, 2 – 3° high; culm thick and sharp, mostly smooth; leaves broad, flat and glaucous, much prolonged; spikes 3 – 5, all but the uppermost peduncled, spreading or drooping, narrowly cylindric (2 – 3′ long), loosely flowered below; perigynium ovate, very strongly many-nerved, the short beak slightly toothed; scale rough-awned and longer than the perigynium. (C. paludosa, *Gooden.*) — Swales, Dorchester, and New Bedford, Mass (Nat. from Eu.) The former station has been recently destroyed.

∗ 3. MICRORHYNCHÆ. — ⊹ 1. *Atràtæ.*

⊹⊹ *Alpine; plant small.*

30. **C. alpìna,** Swartz. Small and slender, ½ – 2° high; culm thin and obtuse, smooth or roughish, naked above; leaves narrow and flat, shorter than the culm; spikes commonly 3, sometimes 2 or 4, aggregated, globular and very small, all closely sessile or rarely the lowest exceedingly short-stalked; perigynium orbicular or obovate, nerveless or nearly so, the short beak slightly notched, a little longer than the ovate and black mostly obtuse scale. — Isle Royale, L. Superior. (Eu.)

31. **C. atràta,** L., var. **ovàta,** Boott. Very slender but erect, 1 – 2° high; culm rather sharp, roughish above; leaves narrow but flat, shorter than the culm; spikes 3 – 5, all but the terminal one on slender stalks ½ – 2′ long, drooping when mature, 1′ long or less, ovate-oblong or short-cylindric, reddish-brown; perigynium broadly ovate, thin and puncticulate, very short-beaked, the orifice slightly notched; scale blunt, thin-margined, about as long as the perigynium. (C. atrata, *Man.*) — White Mountains, N. H., Smugglers' Notch, Vt. (*Brainerd*), and northward.

++ ++ *Paludose; plant larger.*

32. **C. fúsca,** All. Rather slender but stiff, 1 – 3° high; culm sharp, roughish above; leaves very narrow, rough, mostly shorter than the culm; spikes 2 – 4, the terminal rarely all staminate, all sessile and approximate or the lowest sometimes very short-stalked, varying from globular to narrowly cylindric (often becoming 1½′ long), dark brown or variegated; perigynium elliptic and beakless, whitish and granular, nearly nerveless, the orifice entire; staminate scales very long-lanceolate, the pistillate lance-ovate and very sharp, conspicuously longer than the perigynium. (C. Buxbaumii, *Wahl.*) — Bogs, throughout; frequent. (Eu.)

* 3. — + 2. *Rígidæ.*

33. **C. vulgàris,** Fries. Low and stiff, about 1° or sometimes 18′ high; culm sharp, smooth or rather rough above; leaves narrow and stiff, shorter than the culm, glaucous-blue; staminate spike sessile or nearly so; spikes 2 – 4, all sessile or rarely the lowest very short-stalked, short and erect (1′ long or less), very densely flowered or sometimes becoming loose below, the lowest subtended by a bract 1 – 3′ long; perigynium appressed, oval or round-ovate, mostly finely striate toward the base, the beak entire or very nearly so, bright green until over-mature; scale ovate and very obtuse, purple with a faint white nerve, conspicuously narrower and shorter than the perigynium, thus causing the spike in the growing plant to assume a characteristic green-and-black appearance. — Swales and low meadows along the sea-board, from Mass. northward; common. (Eu.)

Var. **strictifórmis,** Bailey. Taller (1½ – 2½° high) and looser; culms slender; leaves long and narrow, lax, scarcely glaucous; staminate spike longer peduncled; pistillate spikes looser and often longer, mostly brown or tawny-green. (C. limula, *Man.*) — Swales from E. Penn. northward, near the sea-board; frequent. Often confounded with n. 34, but easily distinguished by the non-cespitose habit, sheaths not fibrillose, and the short scales very obtuse.

Var. **hyperbòrea,** Boott. Somewhat stoloniferous, low, often smaller than the type; spikes shorter and mostly loosely flowered, often becoming very thin; scales generally longer, giving the spikes a darker color; stigmas often 3. (C. rigida, var. (?) Bigelovii, *Tuckerm.*) — Alpine summits of N. H., Vt., and N. Y. (Eu.)

* 3. — + 3. *Acùtæ.*

++ *Stigmas* 2; *scales not conspicuously acute, or if so, divaricate.*

= *Spikes erect, or rarely spreading in* n. 34.

34. **C. strícta,** Lam. Tall and slender but erect, 2 – 4° high, generally in dense clumps when old, or rarely in small tufts; culm sharp, rough above;

leaves long and narrow, rough on the edges, the lowest sheaths usually becoming prominently fibrillose; 1 or 2 lowest bracts leafy and equalling the culm; spikes 3 – 5, variable in size and shape, scattered, the lowest usually more or less peduncled and clavate and the others sessile, erect or spreading, oblong or cylindric (½ – 2′ long and 2 – 3″ broad), all compactly flowered above but often attenuate at base (or rarely alternate-flowered throughout), the upper mostly staminate at top, all greenish-purple or pallid; perigynium ovate and small, tawny, mostly lightly few-nerved and somewhat granular, the beak very short and commonly entire; scale obtuse to nearly acute, about equalling the perigynium or a little shorter. — Swales, throughout; abundant and variable.

Var. **angustàta.** Stricter; spikes longer and narrower (3 – 4′ long and about 1½″ broad), never clavate, more approximate and always erect, the staminate portion usually much longer (often 1 – 2′), rust-colored; scales narrower and sharper, mostly longer than the perigynium. (C. angustata, *Boott,* in part.) — Same range as the type, but less common.

Var. **decòra,** Bailey. Usually smaller; basal sheaths rarely fibrillose; spikes shorter (seldom over 1′ long), sessile or very nearly so, rarely attenuate at base, spreading, the terminal staminate flowers few, rust-colored; bracts more spreading; scales very sharp and spreading, longer than the perigynium. (C. aperta, *Man.*) — N. Eng. to Wisc.; rather rare.

**C.** STRÍCTA × FILIFÓRMIS. Leaves and culms very slender; spikes short (1′ long or less), sessile and compact, the upper 1 or 2 scarcely bracted, pallid; perigynium small, smooth. — Keweenaw Co., Mich. (*Farwell.*) Exactly intermediate between the two species.

35. **C. aquátilis,** Wahl. Large and stout, glaucous, 2 – 4° high; culm very obtuse and smooth; leaves exceedingly long, broader than in the last, the bracts broad and prolonged far beyond the culm; spikes 3 – 5, 1 – 2′ long, very compact or the lowest sometimes attenuate below, erect, thick (3″ broad or less); perigynium round-ovate or broadly elliptic, nerveless, greenish, imbricated; scale obtuse and much shorter and narrower than the perigynium. — Swamps and lake-margins, N. Eng. to Minn.; not common. (Eu.)

36. **C. lenticulàris,** Michx. Rather slender but erect, pale throughout, 1 – 2° high; culm sharp, usually slightly rough above; leaves very narrow, numerous, much surpassing the culm; spikes 3 – 6, more or less aggregated or the lowest remote, the terminal androgynous or staminate, mostly sessile, erect; perigynium ovate, minutely granular, brown-nerved, the tip empty and entire; scale pale and obtuse, about ½ the length of the perigynium. — Gravelly borders of ponds and lakes, northern N. Eng. to Minn.; mostly local.

= = *Spikes widely spreading or drooping.*

37. **C. tórta,** Boott. Slender but erect, 1½ – 2½° high, in clumps, with exceedingly tough and cord-like roots; culm rather sharp, smooth or roughish above; leaves flat and rather soft, those of the culm very short; spikes 3 – 5, mostly somewhat approximate or the lower remote, the upper sessile and ascending but the others drooping, long and slender (often 3′ long, 2″ broad or less); perigynium lance-ovate, thin and green, nerveless, the slim upper half empty and more or less tortuous, the beak entire or erose; scale purple-margined and very obtuse, shorter than the perigynium. — Cold banks and swamps, Vt. to N. C.; infrequent.

++ ++ *Stigmas* 2; *scales long-acute and ascending.*

38. **C. salìna,** Wahl., var. **cuspidàta,** Wahl. Rather stout, 1 – 2½° high; culm rather sharp, smooth; leaves narrow but flat; spikes 2 – 4, somewhat approximate, the lowest 1 or 2 very short-stalked, erect, short (1½′ or less) and rather thick, the lower subtended by leaf-like bracts 3 – 4′ long; perigynium elliptic, somewhat granular, marked with 2 or 3 nerves or nerveless, the minute beak entire; scale brown-margined, produced into a lighter and rough awn much exceeding the perigynium. (C. salina, *Man.*) — Salt marshes, Mass., and along the coast northward; rare in the United States. (Eu.) Anomalous forms, which appear to be hybrids, have been separated as

**C.** STRÍCTA × SALÌNA, Bailey. Spikes thinner and more scattered, more inclined to be peduncled; scales blunt or short-awned, little exceeding the perigynium. — Near Boston, Mass., *W. Boott*, *Morong.*

++ ++ ++ *Stigmas* 3.

39. **C. prasìna,** Wahl. Slender, somewhat flexuose, 1½ – 2½° high; culm rather sharp, smooth; leaves very narrow, soft and flat, rough; spikes 2 – 3, peduncled and spreading or drooping, somewhat approximate, green, 1 – 2′ long, narrow and loosely flowered; perigynium pale, narrowly triangular-ovate, thin, nearly nerveless, produced into a short but slender entire or minutely toothed beak; scale very thin and acute, nearly colorless, shorter than the perigynium. (C. miliacea, *Muhl.*) — Meadows and bogs, Vt. to Mich., and southward; infrequent.

* 3. — + 4. *Cryptocárpæ.*

40. **C. marítima,** O. F. Mueller. Mostly stout, 1 – 2½° high; culm sharp, smooth or rough above; spikes 2 – 6, scattered, all or all but the upper one on very long weak stalks and pendulous, 1 – 3′ long and thick and bushy, usually staminate at top; perigynium nearly orbicular, pale, few-nerved or nerveless, the beak very short and entire or nearly so; scale produced into a greenish rough awn 3 – 8 times as long as the perigynium. — Salt marshes of the coast, Mass., Maine, and northward; not common. Leaves smooth, broad and flat. (Eu.)

41. **C. crinìta,** Lam. Robust and mostly stout, 2 – 4° high; culm sharp and rough or sometimes smooth; leaves about 3″ broad, flat, more or less rough on the nerves and margins; spikes 3 – 6, somewhat scattered, all variously peduncled, mostly secund, curved and drooping (or in small forms rarely nearly erect), 1 – 4′ long, narrowly and evenly cylindric, compact or attenuate below, often staminate at top; perigynium ovate, thin and puncticulate, obscurely nerved, the minute point entire; scale greenish-brown and rough-awned, 2 – 3 times as long as the perigynium. (C. gynandra, *Schwein.*) — Swales; common. — Var. MÌNOR, Boott. Much smaller in all its parts, 10 – 18′ high; leaves narrow; spikes 3 – 4, 1½′ long or less, less drooping; scales less prominent. — Maine to N. Y.; scarce. Somewhat resembles n. 39.

**C.** CRINÌTA × TÓRTA, Bailey. More slender than C. crinita, the leaves narrower; spikes nearly as slender as those of C. torta; scales blunt or simply acute and little longer than the perigynium, or sometimes very short-awned. — Moist meadows near the Glen House, White Mts. (*Brainerd*). Might be mistaken for drooping-spiked forms of n. 34.

* 3. — + 5. *Pendulìnæ.*

++ *Spikes narrowly cylindrical.*

42. **C. littoràlis,** Schwein. Somewhat slender but erect, 1 – 2° high; leaves narrow and rather stiff, flat, glaucous, shorter than the sharp and nearly smooth culm; staminate spikes 1 – 3, dark purple, 1½′ long or less, the scales obtuse; pistillate spikes 2 – 4, somewhat approximate, on thread-like peduncles, 1 – 2′ long, usually staminate at top; perigynium lance-oval, faintly nerved, the minute beak entire, mostly longer than the obtuse purple scale; bracts prominently purple-auricled. (C. Barrattii, *Schwein. & Torr.*) — Marshes near the coast, N. J. and southward; rare.

++ ++ *Spikes globular or oblong.*

= *Scales very sharp, prominently longer than the perigynium.*

43. **C. Magellánica,** Lam. Slender but erect, 8 – 18′ high; leaves flat and lax, somewhat shorter than the culm; lowest bract as wide as the leaves or nearly so and exceeding the culm; spikes 2 – 3, approximate, all slenderly stalked and drooping; perigynium orbicular or broad-ovate, nerved in the centre, ½ - ⅔ the length of the scale. (C. irrigua, *Smith.*) — Deep swamps, throughout, north of Penn.; local. (Eu.)

= = *Scales blunt, little exceeding the perigynium.*

44. **C. rariflòra,** Smith. Very small but stiff, 4 - 10′ high, somewhat stoloniferous; culm obtuse and very smooth; leaves very narrow, becoming involute, shorter than the culm; spikes 1 - 2, only 3 – 10-flowered, drooping, borne in the axil of a minute awl-like and purple-auricled bract; perigynium ovate, nearly pointless, obscurely nerved, mostly a little shorter than the enveloping scale. — Mt. Katahdin, Maine (*Goodale*). (Eu.)

45. **C. limòsa,** L. Slender but rather stiff, 1 – 2° high, stoloniferous; culm sharp, rough above; leaves very narrow, strongly keeled or involute; spikes 1 – 2, nodding on short stalks or the upper one erect, oblong, springing from the axil of a very narrow bract which is nearly always shorter than the culm; perigynium very short-pointed, about the length of the broad scale. — Deep swamps, throughout, north of Penn.; local. (Eu.)

* 4. Hymenochlǽnæ. — + 1. *Virescéntes.*

46. **C. viréscens,** Muhl. Slender, erect or spreading, 1 - 1½° high; leaves very narrow, more or less hairy; spikes 3 - 5, green, short-oblong, all somewhat stalked and often spreading, compact (1½″ thick or less); perigynium ovate and costate, very hairy, longer than the thin and white acute scale. — Var. costàta, Dewey, usually the commoner form, is taller (often reaching 2½°), with spikes long-cylindric, ½ – 2′ long, and a stronger ribbed perigynium. — Banks and copses, N. Eng. to Mich., and southward; common eastward.

47. **C. trìceps,** Michx., var. **hirsùta,** Bailey. Usually stiffer; leaves hairy; spikes 2 – 4 (usually 3), all contiguous or occasionally the lowest somewhat removed, sessile, short-oblong or globular, green or brown (2 – 3″ thick); perigynium broad-ovate, flattish, very obtuse, often sparsely hirsute when young but smooth at maturity; staminate scales very sharp; pistillate scales acute or short-awned, about the length of or shorter than the perigynium. — Dry copses and fields, N. Eng. to Mo., and southward; rare northward. — Var.

Smíthii, Porter. Tall, slender, olive-green, the leaves very long, very nearly smooth; spikes small, globular or short-cylindrical (½′ long or less), the lowest often somewhat remote, all more inclined to be peduncled; perigynium globular and turgid, brown, squarrose, giving the spike a characteristic plump appearance. — Fields and woodlands, southern N. J., E. Penn., and southward; also in Ark.; frequent.

∗ 4. — ← 2. *Sylváticæ.*

48. **C. longiróstris,** Torr. Very slender but erect, 1½ - 3° high, growing in stools; leaves narrow, flat, loose; spikes 3 - 5, 1 - 2′ long, loosely flowered, drooping; perigynium thin, slightly inflated, green, nearly nerveless, spreading, the beak longer than the body, about the length of the awned scale. — Shady banks from N. Eng. to Neb., and northward; frequent. — Var. mìnor, Boott. Smaller and slenderer; spikes 9″ long or less, very narrow and very loosely or even alternately few-flowered; perigynium smaller. Neb. and westward.

∗ 4. — ← 3. *Fléxiles.*

49. **C. castànea,** Wahl. Slender but erect, 1 - 2½° high; leaves broad and flat, hairy, much shorter than the rough culm; spikes 2 - 4, approximate, widely spreading or drooping on filiform stalks, 1′ long or less, rather dense, tawny; perigynium broad-lanceolate, gradually narrowed into a beak ½ as long as the body, thin, with a nerve on each side, longer than the light brown or whitish acute thin scale. (C. flexilis, *Rudge.*) — Banks, Conn. to Minn.; local.

**C.** arctàta × castànea, Bailey. Leaves mostly narrower, less hairy or smooth; spikes very slender and loosely flowered (scarcely over 1″ wide), erect or drooping, chestnut color; perigynium thin, long-ovate, shorter-beaked, lightly nerved, mostly surpassing the pointed whitish scale. (C. Knieskernii, *Dewey.*) — Oneida Co., N. Y.; Keweenaw Co., Mich. (*Farwell*); N. Minn.

50. **C. capillàris,** L. Very slender but erect, 2 - 12′ high; culm smooth, longer than the narrow flat or at length involute leaves; spikes 2 - 4, either scattered or approximate, all more or less long-peduncled and drooping, borne in the axils of conspicuous sheathing bracts, very small (3 - 12-flowered); perigynium thin, very small, oblong-ovoid, the beak hyaline-lipped, longer than the very obtuse white scale. — Alpine summits of the White Mts.; Cortland, N. Y., Alcona Co., Mich., and Point de Tour, L. Huron. (Eu.)

∗ 4. — ← 4. *Débiles.*

↔ *Perigynium thin, rarely with more than two prominent nerves.*

51. **C. arctàta,** Boott. Slender, erect, 1 - 2° high; radical leaves much shorter than the culm and very broad (2½ - 5″), flat; bracts broad and short, long-sheathing; spikes 3 - 5, all widely spreading or drooping on filiform stalks, 1 - 3′ long and exceedingly slender; perigynium short (2″ long or less), abruptly and conspicuously stipitate and abruptly contracted into a beak, 3-cornered, prominently nerved, green, mostly spreading, scarcely longer than the very sharp or cuspidate scale. — Woods and copses, N. Eng. to Penn. and Minn.; common.

Var. **Faxòni,** Bailey. Spikes shorter and usually short-peduncled, erect or nearly so, much more densely flowered, part of them commonly contiguous at the top of the culm, rendering the shorter staminate spike inconspicuous;

perigynium usually larger. — Lisbon, N. H. (*Faxon*); Keweenaw Co., Mich. (*Farwell*); extreme northern Minn. (*Bailey*); also in Canada.

52. **C. débilis,** Michx., var. **Rúdgei,** Bailey. Very slender and diffuse, 1–2½° high (or rarely reduced to 3–4′!); leaves narrow and lax, longer than the culm; spikes mostly heavier than in the last; perigynium much longer, very gradually narrowed at each end, scarcely angled and not prominently nerved, rusty when ripe, erect, twice longer than the obtuse or acutish scale. (C. debilis, of last ed.) — Copses, N. Eng. to N. Mich., and southward; frequent east and southward. — Var. STRÍCTIOR, Bailey. Usually taller, strict; leaves broader (about 2″ wide) and firmer; spikes stiffer, simply spreading or even erect; perigynium mostly shorter and greener, often little exceeding the scale. White Mts. (*Faxon*). — Var. PÙBERA, Gray. Perigynium usually more slender, more nerved and minutely pubescent. Center and Lancaster Counties, Penn. (*Porter, Lumsden*), and Bedford Co., Va. (*Curtiss*).

**C.** DÉBILIS × VIRÉSCENS, Bailey. Plant slender and very green; leaves flat, rough, mostly longer than the culm, spikes 2–3, 2′ long, thin and slender, erect or nearly so, the terminal one bearing a few pistillate flowers at top; perigynium exactly intermediate between the two species, lance-ovate, nerved and slightly hairy, short-beaked, thin, twice longer than the scale. — Revere, near Boston, Mass. (*Faxon*).

++ ++ *Perigynium firm, prominently many-nerved.*

53. **C. venústa,** Dewey, var. **minor,** Boeckl. Slender but strict, 1½–2° high; leaves narrow and strict, about as long as the culm; spikes 1–2′ long, scattered, the upper usually ascending, the terminal one sometimes staminate at top; perigynium ascending, the very short and stout beak prominently toothed, thrice longer than the rusty narrow scale. (C. glabra, *Boott.*) — Sphagnous swamps, Oneida Co., N. Y., N. J., and southward; local.

∗ 4. — + 5. *Gracíllimæ.*

++ *Perigynium small, scarcely turgid.*

54. **C. æstivàlis,** M. A. Curtis. Slender but erect, 1–1½° high; leaves very narrow, flat, shorter than the culm, the sheaths pubescent; spikes 3–4, erect or spreading, 1–2′ long and very loosely flowered, all but the lowest short-stalked; perigynium very small, ovate, scarcely pointed and the orifice entire, few-nerved, about twice longer than the obtuse scale. — Saddle Mountain, W. Mass., and southward in the mountains to N. C.; rare.

55. **C. gracíllima,** Schwein. Tall and slender, sometimes diffuse, 1½–3° high; leaves broad and flat (the radical about 3″ wide), very dark and bright green; spikes 3–4, scattered, the terminal rarely staminate, densely flowered except at base, peduncled and drooping, green; perigynium ovate, thin and slightly swollen, nerved, obtuse, orifice entire, twice longer than the very obtuse scale. — Woodlands and low meadows, throughout; common. — In poorer soil and sunny places, it runs into var. HÙMILIS, Bailey, and is then smaller, has much narrower leaves and very small erect spikes (2–12-flowered), and mostly smaller perigynia.

**C.** GRACÍLLIMA × HIRSÙTA, Bailey. In habit like var. humilis; spikes tawny; perigynium like that of C. triceps, var. hirsuta; plant smooth, or very minutely pubescent under a strong lens. — Philipstown, N. Y. (*Barratt*).

**C.** GRACÍLLIMA × PUBÉSCENS, Bailey. Tall and erect; leaves narrower than in the last, usually slightly hairy; spikes slender, erect or slightly spreading, often staminate at top; perigynium exactly intermediate between the two species, ovate, obscurely nerved, sparsely hairy, beaked, about the length of the ovate ciliate rough-awned scale. (C. Sullivantii, *Boott.*) — Columbus, Ohio (*Sullivant*); Yonkers, N. Y. (*E. C. Howe*); Stanton, Del. (*Commons*).

++ ++ *Perigynium large, prominently inflated.*

56. **C. formòsa,** Dewey. Slender, erect, 1 – 2½° high; leaves flat, mostly rather broad, those of the culm very short; spikes 3 – 5, scattered, oblong or short-cylindrical (1′ long or less), compact, all flexuose or drooping; perigynium ovate, puncticulate, obscurely nerved, short-beaked with a slightly notched orifice, all but the lowest one or two twice longer than the blunt or cuspidate scale. — Woods and copses, Vt. to Mich.; local.

57. **C. Davísii,** Schwein. & Torr. Always taller; spikes heavier; perigynium more inflated, strongly nerved and prominently toothed, no longer or shorter than the conspicuously awned and spreading scale. — Wet meadows, W. Mass. to S. Minn., and southward; rare east and northward.

* 4. — +- 6. *Gríseæ.*

58. **C. grísea,** Wahl. Stout, 1 - 2° high; leaves broad (2 – 3″) and slightly glaucous; bracts broad and leaf-like, diverging, very much exceeding the culm; staminate spike small and sessile; pistillate spikes 3 – 4, short (1′ long or less), the highest two usually contiguous to the staminate spike and sessile, the others somewhat remote and peduncled, all erect, compact; perigynium oblong, pointless, marked with impressed nerves, turgid and cylindric, all but the lowest longer than the narrow, cuspidate or blunt, nerved scale. — Moist grounds, throughout, except along our northern borders; common. — Var. ANGUSTIFÒLIA, Boott. Much more slender; leaves scarcely half so wide, the bracts, especially, much narrower and shorter and more erect; spikes slender; perigynium scarcely inflated, triangular-oblong, bearing a sharp beak-like point, 2-ranked; scale nerveless, long-awned and spreading. N. J. to S. Ohio, and southward; common. — Var. GLOBÒSA, Bailey. Low, 3 - 12′ high, often spreading; spikes few-flowered, often with but 2 or 3 perigynia; perigynium short, inflated, very blunt, nearly globose or obovate; scale short, not prominently cuspidate or the upper ones wholly blunt. Mo., Kan., and southward.

Var. (?) **rígida,** Bailey. Rigid; leaves rather narrow, long and erect; staminate spike prominently peduncled; pistillate spikes scattered, all more or less stalked, conspicuously 2-ranked; perigynium triangular-oblong, hard, longer than the cuspidate ascending scale. — Sellersville, Penn., and Del.

59. **C. glaucodèa,** Tuckerm. Lax or somewhat strict (6 – 18′ high), densely glaucous; leaves flat, variable in width; spikes as in n. 58; perigynium firm, not inflated, prominently impressed-nerved, glaucous, longer than the short-cuspidate or blunt thin and appressed scale. (C. flaccosperma, last ed.) — Meadows and swamps, Mass. to S. Ill., and southward; local.

* 5. SPIROSTÀCHYÆ. — +- 1. *Granuláres.*

60. **C. granulàris,** Muhl. Erect or spreading, 8′ - 2° high, somewhat glaucous; leaves flat, various; bracts broad and long, much exceeding the culm; spikes 3 – 4, scattered, all but the upper peduncled, erect or ascending,

compact, short-oblong to cylindric, never exceeding 1′ in length; staminate spike small and usually sessile; perigynium ovoid, very strongly nerved, the nearly entire short beak usually bent; scale thin and pointed, about ½ the length of the perigynium. — Moist grassy places; common. — Var. HALEÀNA, Porter. Habitually lower and more slender; radical leaves very broad (3 – 4″) and more glaucous; pistillate spikes ½′ long or less, thinner; perigynium a half smaller, narrower. Wisc. to Va.; infrequent.

61. **C. Cràwei,** Dewey. Low, strict, stoloniferous (4 – 12′ high); leaves narrow; bracts scarcely exceeding the culm; spikes 2 – 4, scattered, the lowest radical or nearly so, short-peduncled or the upper sessile, erect, compact, 9″ long or less; staminate spike generally peduncled; perigynium ovate, usually resinous-dotted, obscurely or few-nerved, very short-pointed, longer than the obtuse or short-pointed scale. — Moist places, N. Y. to Ill. and Minn.; local, especially eastward.

∗ 5. — + 2. *Exténsæ.*

**C.** EXTÉNSA, Gooden. Slender but strict, 1 – 2° high; leaves involute; spikes about 3, the lowest remote and short-peduncled, the remainder approximate and sessile, short (about ½′ long) and compact; perigynium ovate, very strongly nerved, ascending, the short stout beak sharply toothed, longer than the blunt brown-edged scale. — Long Island and Coney Island, N. Y.; Norfolk, Va., *McMinn.* (Nat. from Eu.)

62. **C. flàva,** L. Very slender but strict and stiff, 1 – 2° high, yellowish throughout; leaves flat but narrow, mostly shorter than the culm; staminate spike sessile or nearly so, usually oblique; pistillate spikes 2 – 4, all contiguous or rarely the lowest one remote, all but the lowest sessile, short-oblong or globular, densely flowered, the lowest subtended by a long divaricate bract; perigynium ovate, produced into a deflexed beak as long as the body, strongly nerved, thrice longer than the blunt scale. — Swales and wet meadows, N. Eng. to L. Superior; rare westward. (Eu.) — Var. GRÁMINIS, Bailey. Smaller and green, 6 – 12′ high; leaves mostly longer than the culm; bracts erect; perigynium straight or nearly so, the beak often rough. Grassy places, probably common and generally distributed.

Var. **virídula,** Bailey. Small and slender, very strict, green or greenish-white; leaves narrow, equalling or exceeding the culm; bracts long and strictly erect; spikes very small or sometimes becoming cylindric, more closely aggregated; perigynium conspicuously smaller, the beak very short and straight. (C. Œderi, last ed.) — Cold bogs, N. Eng. to Penn., and northwestward; local.

∗ 5. — + 3. *Pallescéntes.*

+ *Perigynium wholly beakless.*

63. **C. palléscens,** L. Slender, erect, 4′ – 2° high, tufted; leaves narrow, flat, the lower slightly pubescent, particularly on the sheaths; spikes 2 – 4, ½′ long or less, densely flowered, all but the upper one very shortly peduncled, erect or spreading; perigynium globular-oblong, thin and very nearly nerveless, about the length of the cuspidate scale. — Glades and meadows, N. Eng. to Penn., Wisc. and L. Superior; rare westward. (Eu.)

+ + *Perigynium very stout-beaked.*

64. **C. Torrèyi,** Tuckerm. Stiff, 1 – 1½° high; culm and leaves thinly pubescent; spikes all sessile, very short; perigynium obovate, very strongly

many-nerved, retuse, the beak short and straight, equalling or exceeding the mostly cuspidate scale. — Supposed to have been collected, a half-century ago, in N. Y. by Torrey, and in Penn. by Schweinitz. It occurs in the Rocky Mountain region, and high northward.

### * 6. DACTYLOSTÀCHYÆ. — +– 1. *Oligocárpæ.*

### ++ *Sheaths smooth.*

65. **C. conoídea,** Schkuhr. Slender but strict, 1 – 1½° high; staminate spike long-peduncled or rarely nearly sessile; spikes 2 – 3, scattered, short-stalked or the upper one sessile (the lowest frequently very long-stalked), oblong (rarely 1′ long) and rather loosely flowered, erect; perigynium oblong-conical, impressed-nerved, gradually narrowed to a point, the orifice entire; scale loosely spreading and rough-awned, equalling or exceeding the perigynium. — Moist grassy places, N. Eng. to Ill., and southward; rare westward.

66. **C. oligocárpa,** Schkuhr. Diffuse, 10 – 18′ high; bracts flat and spreading; staminate spike sessile or stalked; spikes 2 – 4, scattered, stalked or the uppermost sessile, loosely 2 – 8-flowered, erect; perigynium small, hard, finely impressed-nerved, abruptly contracted into a conspicuous mostly oblique beak, the orifice entire; scale very loosely spreading and rough-awned, longer than the perigynium. — Dry woods and copses, W. New Eng. to Mo., and southward; rare westward. Often confounded with small forms of n. 58.

### ++ ++ *Sheaths pubescent.*

67. **C. Hitchcockiàna,** Dewey. Erect, 1½ – 2° high; spikes 2 – 4, all more or less peduncled, very loosely few-flowered, erect; perigynium triangular-ovate, many-striate, the strong beak prominently oblique, shorter than the rough-awned scale. — Rich woods, W. New Eng. to Ill., and southward to Penn. and Ky.; frequent.

### * 6. — +– 2. *Laxiflòræ.*

### ++ *Sheaths green.*

### = *Perigynium mostly obscurely triangular, the beak very prominent.*

68. **C. laxiflòra,** Lam. Slender but mostly erect, 1 – 2° high; leaves rarely over 2″ wide, rather soft; staminate spike peduncled or at least conspicuous; pistillate spikes 2 – 4, scattered, peduncled or the upper one sessile, loosely flowered, cylindric or sometimes reduced to short-oblong, erect or the lower loosely spreading; perigynium obovate, conspicuously nerved, the short entire beak much bent or recurved; scale thin and white, blunt or cuspidate, mostly shorter than the perigynium. — Grassy places, throughout; common. Exceedingly variable. — Var. VÀRIANS, Bailey. Mostly stouter than the type, the leaves broader; pistillate spikes ½ – 1′ long, the two upper more or less contiguous to the staminate spike and sessile or nearly so; bracts leafy and prolonged. — Copses and grassy places, throughout; common. Counterfeits var. patulifolia. — Var. STRIÁTULA, Carey. Diffuse; pistillate spikes rarely over ½′ long, the upper sessile and aggregated about the inconspicuous staminate spike, the lowest usually long-exserted. Grassy places, throughout; very common. — Var. LATIFÒLIA, Boott. Rather low; leaves ½′ broad or more; staminate spike sessile or very nearly so; pistillate spikes cylindric and loose, the upper one or two contiguous; bracts very broad. Deep rich woods, E. Mass. (*Deane*) to Penn. and Mich.; common westward. — Var. PATULIFÒLIA,

Carey. Glaucous; leaves 3″ broad or more; staminate spike prominent, mostly stalked; pistillate spikes long and alternately flowered, scattered and peduncled; perigynium (as in the following varieties) elliptic, attenuate at both ends, mostly less prominently nerved, and the beak not strongly recurved. Open places, N. Eng. to Mich., and southward; frequent. — Var. DIVARICÀTA, Bailey. Tall and stout; leaves narrower; staminate spike large and stalked; pistillate spikes scattered, all but the upper one prominently peduncled, long; perigynium very large, divaricate, triangular, contracted into a stipe-like base at least half as long as the body. Near Washington, *Vasey*. — Var. STYLOFLÉXA, Boott. Very weak and slender; leaves 2″ wide or less; staminate spike usually peduncled; pistillate 2 – 3, scattered, few-flowered, lowest drooping; perigynium very long-pointed. S. E. Penn., and southward; frequent.

= = *Perigynium sharply triangular, short, and mostly not prominently beaked.*

a. *Spikes drooping or flexuose.*

69. **C. digitàlis,** Willd. Very slender, bright green, tufted, 6 – 18′ high; leaves very narrow (1 – 2″ wide); staminate spike short-stalked; pistillate spikes 2 – 4, all on filiform stalks and all but the upper widely spreading or drooping, linear, alternately flowered; perigynium very small, impressed-nerved, longer than the acute whitish scale. — Dryish woods and glades, N. Eng. to Mich., and southward; frequent. — Var. COPULÀTA, Bailey. Leaves much broader, and the culms weak and reclined; spikes heavier and mostly shorter; perigynium larger, very sharp. Rich woods, central Mich., and probably elsewhere westward.

70. **C. laxicúlmis,** Schwein. Differs from the variety of n. 69 chiefly in its more cespitose habit, its densely glaucous-blue covering, very slender culm, and very long and filiform peduncles. (C. retrocurva, *Dewey*.) — Glades, N. Eng. to Mich. and Va.; rare westward.

b. *Spikes erect.*

71. **C. ptychocárpa,** Steudel. Low, glaucous, 3 – 10′ high; leaves flat and rather broad (2″ or more), much exceeding the culm; bracts leafy and much prolonged; staminate spike very small and sessile, mostly overtopped by the upper pistillate spike; pistillate spikes 2 – 3, sessile or short-stalked or rarely the lowest long-peduncled, erect; perigynium tawny, much as in n. 69, twice longer than the very thin obtuse scale. — Low grounds or swamps, E Mass., N. J., Del., and southward; local.

72. **C. platyphýlla,** Carey. Low, spreading, glaucous, 6 – 12′ high; leaves ½′ broad or more, mostly shorter than the culms; bracts with thin and sharp-pointed leaf-like tips 1 – 2′ long; staminate spike stalked; pistillate spikes 2 – 3, scattered, all more or less peduncled, alternately 2 – 10-flowered; perigynium short, strongly many-striate, about the length of the acute or cuspidate scale. — Rich shady woods and banks, N. Eng. to Mich., and southward to Va.; mostly local.

73. **C. Careyàna,** Torr. Tall and slender, mostly erect, 1 – 2° high, leaves bright green, firm, 3 – 4″ wide or more, shorter than the long culm; bracts leafy, longer than in the last; staminate spike heavy and stalked; pistillate spikes 2 – 3 (mostly 2), the upper usually near the terminal spike, and nearly sessile, the other remote and long-peduncled, loosely 2 – 8-flowered;

perigynium very large and very sharply angled, the beak oblique, finely many-nerved, twice longer than the sharp scale. — Rich woods, N. Eng. to Mich., and southward to Washington; rare.

++ ++ *Sheaths usually purple.*

74. **C. plantagínea**, Lam. Slender but erect, 1 – 2° high; leaves ½ – 1′ broad, very firm, appearing after the flowers and persisting over winter, shorter than the culm; staminate spike purple and clavate, stalked; pistillate spikes 3 – 4, scattered, loosely few-flowered, erect, the peduncles included in the leafless sheaths; perigynium smaller than in n. 73, prominently beaked, about as long as the sharp scale. — Rich woods, N. Eng. to Wisc., and southward; local.

* 6. — + 3. *Panîceæ.*

++ *Beak cylindrical and prominent; plant not glaucous.*

75. **C. Saltuénsis**, Bailey. Very slender and more or less diffuse, strongly stoloniferous, 1 – 1½° high; leaves narrow and soft, shorter than the culm; spikes 2 – 3, scattered, all peduncled and more or less spreading, loosely 3 – 10-flowered; perigynium small, nearly nerveless, thin, the beak straight and sharply toothed; scale loose, acute, shorter than the perigynium. (C. vaginata, last ed.) — Deep swamps, Vt. to Minn.; local.

76. **C. polymórpha**, Muhl. Stout, 1 – 2° high; leaves rather broad, short; spikes 1 – 2, short-stalked, erect, compact or rarely loose, usually staminate at the apex, 1½′ long or less; perigynium long-ovate, obscurely nerved; the very long and nearly straight beak oblique or lipped at the orifice; scale reddish-brown, obtuse, shorter than the perigynium. — Moist meadows, Mass. to N. C.; local.

++ ++ *Beak short or none; plant often glaucous.*

= *Plants of ordinary habit.*

77. **C. tetánica**, Schkuhr. Rather slender, rarely glaucous, somewhat stoloniferous; culm scabrous, at least above; spikes all peduncled, the upper one very shortly so, pale, all more or less attenuate below, the lower borne in the axils of bracts 3′ long or more; perigynium not turgid, greenish, prominently many-nerved, the beak strongly bent; scale obtuse or abruptly mucronate, all except the lowest mostly shorter than the perigynium. — Meadows and borders of ponds from W. Mass. westward; common westward. — Var. Woòdii, Bailey. Very slender and strongly stoloniferous; leaves narrow, very long and lax; spikes mostly alternately flowered throughout; scales often sharper. (C. Woodii, *Dewey.*) Rich woods, N. Y. to Mich., and south to Washington; frequent. — Var. Mèadii, Bailey. Stiffer; leaves mostly broader and stricter; spikes thick and densely flowered, not attenuate at base, the upper one often sessile; perigynium larger. (C. Meadii, *Dewey.*) R. I. to Neb., and southward; rare eastward. — Var. Cánbyi, Porter. Stout and stiff; leaves still broader (about 2″ wide) and flat; spikes thick, often ¼′ wide; perigynium long, straight or very nearly so; scale large, nearly equalling or exceeding the perigynium. E. Penn. (*Canby*); Ill. and Wisc.; little known.

**C. panícea**, L. Strict, often stiff, glaucous-blue 1 – 2° high; culm smooth; bracts 1 – 2′ long; spikes 1 – 3, scattered, colored, peduncled, erect, rather compact or loose below, seldom 1′ long; perigynium ovoid, yellow or purple, somewhat turgid, scarcely nerved, the point usually curved, mostly longer than the purple-margined scale. — Fields, E. Mass. and R. I. (Nat. from Eu.)

= = *Very strict, densely glaucous.*

78. **C. lívida,** Willd. Culms 18′ high or less; leaves narrow, often becoming involute; spikes 1 or 2 and aggregated or approximate, or rarely a third nearly radical, sessile or nearly so, erect, narrow; perigynium ovoid-oblong, nerved, granular, beakless, the point straight or nearly so, orifice entire; scale obtuse, mostly a little shorter than the perigynium. — Pine-barrens of N. J., and sphagnum swamps northward to N. Eng. and L. Superior; local. (Eu.)

∗ 6. — + 4. *Bicolòres.*

79. **C. aùrea,** Nutt. Low and slender, 1° high or less; bracts exceeding the culm; spikes 2 - 4, all but the lowest usually approximate, peduncled or the upper one or two sessile, erect, loosely few-flowered or sometimes becoming ¾′ long, at maturity yellow or brown, the terminal one frequently pistillate above; perigynium fleshy at maturity, nerved, longer than the blunt scale. — Wet meadows and springy banks, throughout; rather common.

∗ 6. — + 5. *Digitàtæ.*

++ *Spikes two or more.*

80. **C. ebúrnea,** Boott. Exceedingly slender and capillary, erect, 4 – 12′ high, stoloniferous; leaves shorter than the culm; staminate spike very small and very short-peduncled, overtopped by the two upper pistillate spikes; pistillate spikes 2 – 4, approximate or the lowest remote, all stalked, erect, 2 – 6-flowered; perigynium very small, almost nerveless, smooth and becoming black and shining at full maturity; scale white and thin, obtuse, shorter than the perigynium. — Tufted in sandy or light soils from N. Eng. to Ky. and Neb.; frequent.

81. **C. Richardsòni,** R. Br. Rather stiff, 4 – 9′ high, stoloniferous; sheaths short, purple or brown; staminate spike stout and mostly short-peduncled; pistillate spikes 1 – 2, approximate, the very short stalks included, erect, compact, less than ½′ in length; perigynium obovoid, firm, hairy, the very short beak entire or erose; scale brown with a conspicuous white-hyaline margin, obtuse or pointless, and longer than the perigynium. — Dry ground, western N. Y. to Ill., and northwestward; rare.

82. **C. pedunculàta,** Muhl. Low and diffuse, 3 – 10′ high, forming mats; leaves abundant, very green, flat and firm, longer than the weak culms; staminate spike very small, with the uppermost pistillate spike sessile at its base; pistillate spikes 2 – 4 on each culm, scattered and long-peduncled from green sheaths, erect or spreading, many other spikes nearly or quite radical and very long-stalked, all 3 – 8-flowered; perigynium triangular-obovate, smooth or very slightly pubescent above, the short and nearly entire beak somewhat oblique; scale green or purple, truncate and cuspidate, mostly a little longer than the perigynium. — Dry woods and banks, N. Eng. to Va. (*Kennedy*) and Minn.; frequent northward.

++ ++ *Spike one or rarely a rudiment of a second; plant diœcious.*

83. **C. picta,** Steudel. Rather weak, 1° high or less; leaves flat and firm, persisting through the winter, at least twice longer than the culm; a sheathing purple scale at the base of the spike; staminate spike about 1′ long, clavate in anthesis, the purple scales ending in a very short and blunt whitish tip; pistillate spike narrower and mostly longer, the scales more abruptly contracted

into a colored cusp and at length deciduous; perigynium obovate, much contracted below into a stipe-like base, very strongly nerved, entirely pointless, hairy above, covered by the scale. (C. Boottiana, *Benth.*) — In a wooded ravine with Hepatica and Epigæa, near Bloomington, Ind. (*Dudley*); also Ala. and La.

∗ 7. SPHÆRIDIÓPHORÆ. — ⊷ 1. *Scirpìnæ.*

84. **C. scirpoídea,** Michx. Strict, the pistillate plant mostly stiff, 6 – 18′ high; leaves flat, shorter than the culm; spike 1′ long or less, densely cylindrical, very rarely with a rudimentary second spike at its base; perigynium ovate, short-pointed, very hairy, about the length of the ciliate purple scale. — Mountains of N. New Eng.; Drummond's Island, L. Huron. (Norway.)

∗ 7. — ⊷ 2. *Montànæ.*

⧺ *Some or all of the culms longer than the leaves* (*or in the type of* n. 85 *frequently shorter*).

= *Staminate spike minute, wholly or partially concealed in the head; leaves always very narrow; radical spikes often present.*

85. **C. defléxa** Hornem. Diffuse and low, tufted; culms 1 – 6′ high, setaceous, more or less curved or spreading, little exceeding or shorter than the leaves; staminate spike exceedingly minute and nearly always entirely invisible in the head; pistillate spikes 2 – 3, 2 – 5-flowered, green, or green and brown, all aggregated into a head, the lowest one always more or less short-peduncled and subtended by a leafy bract ½′ long or less; radical spikes few; perigynium very small and much contracted below, sparsely hairy or nearly smooth, the beak flat and very short, mostly longer than the acutish scale. (C. Novæ-Angliæ, last ed., mostly.) — High mountains of N. H. and Vt.

Var. **Dèanei,** Bailey. Taller and lax, the culms 6 – 12′ high and some or all prominently longer than the longer and loose leaves; staminate spike much larger (2 – 3″ long), erect or oblique, sessile; pistillate spikes larger (4 – 8-flowered), less aggregated or the lowest usually separated, though rarely more than ½′ apart; radical spikes usually numerous; bract mostly longer. — Swales or dryish places, high or subalpine regions, Mt. Desert, Maine (*Rand*); Essex, Mass.; N. H., Vt., and N. Y.; scarce. In aspect like n. 86.

Var. **mèdia,** Bailey. Rather stiff, 4 – 12′ high, in dense tufts; most of the spikes equalling or exceeding the leaves, the staminate prominent, erect (3 – 5″ long), sessile or very short-peduncled; pistillate spikes 2 – 3, all scattered, the uppermost at or near the base of the staminate spike, the lowest usually very prominently peduncled and subtended by a conspicuous bract which surpasses the culm, all rather compactly 3 – 8-flowered, green, or brown and green; radical spikes several; perigynium larger, much like that of short-beaked forms of n. 90. — Keweenaw Co., Mich. (*Farwell*); also far westward.

86. **C. vària,** Muhl. Erect, mostly strict, 6 – 15′ high, tufted and somewhat stoloniferous; culms variable in length, often twice longer than the leaves; staminate spike 3″ long or less; pistillate spikes closely aggregated, or rarely somewhat loosely disposed but never scattered, all strictly sessile, green; radical spikes none; lower bract usually present; perigynium longer-pointed than in the last, about the length of the sharp scale. (C. Emmonsii, *Dewey.*) — Banks and dry woods; frequent. — In var. COLORÀTA, Bailey, the scales are purple. Mostly southward.

= = *Staminate spike very prominent (or in the variety of* n. 89 *very small, but the leaves broad); radical spikes none.*

a. *Scales smooth.*

87. **C. Nòvæ-Ángliæ,** Schwein. Very slender and soft, erect, stoloniferous, 6 – 8′ high; culms little longer than the very narrow leaves; staminate spike exceedingly narrow (3 – 8″ long by about ½″ wide), mostly minutely peduncled; pistillate spikes 2, or rarely 3, the upper one near the base of the staminate spike, the lower very short-peduncled and removed ½ – 1′ and subtended by a leafy bract which nearly or quite equals the culm, both rather loosely 3 – 6-flowered; perigynium very narrow, often nearly oblanceolate, small, very thinly hairy, the beak sharp and prominent; stigmas often 2. — Mountain swamps of W. Mass., and Mt. Desert, Maine (*Rand*); rare.

88. **C. Pennsylvánica,** Lam. A foot high or less, erect, strongly stoloniferous, forming large patches; leaves narrow and more or less involute, dark or dull green, mostly nearly as long as the culm; staminate spike ½′ (rarely ¾′) long, usually dull brown or brown-purple, sessile or very nearly so; pistillate spikes 1 – 3, contiguous or the two lower rarely ½′ apart, all sessile and usually dark-colored, the lowest bract very short or at least rarely prominent; perigynium short- or round-ovate, hairy. — Dry fields; our commonest species.

89. **C. commùnis,** Bailey. Habitually taller and stricter, 8 – 18′ high, in small tufts, never stoloniferous; leaves proportionately shorter, broad (about 2″), flat and pale; staminate spike mostly longer, often short-peduncled and usually paler; pistillate spikes 2 - 4, scattered on the upper part of the culm, green or tawny, the lowest one or two sometimes peduncled and often with prominent leafy bracts. (C. varia, last ed.) — Dry hill-sides; common.

Var. **Wheèleri,** Bailey. Mostly greener, 3 – 14′ high; leaves soft and flat and much shorter than the culm; staminate spike ¼′ long or less, very narrow, sessile and oblique; pistillate spikes mostly closer together. — Knolls in woods, Ionia Co., Mich. (*Wheeler*), and Alcona Co. (*Bailey*); Middletown, Conn. (*Barratt*), and Cheshire Co., N. H. It has much the aspect of n. 86, but is readily distinguished by the broad leaves and more scattered spikes.

b. *Scales rough-cuspidate.*

**C.** PRÆCOX, Jacq. Rather stiff, the culm sometimes curved, 3 – 10′ high; leaves flat, shorter than the culm; staminate spike prominently clavate, mostly sessile; pistillate spikes 2 – 3, all contiguous, sessile or the lowest very short-peduncled and subtended by a bract scarcely as long as itself, all oblong or short-cylindric, the lowest about 6″ long; perigynium triangular-obovoid, the very short beak entire or erose, thinly hispid-hirsute, about the length of the scale. — Fields, E. Mass. (Nat. from Eu. early in the century.)

++ ++ *Part or usually all of the culms much shorter than the leaves.*

90. **C. umbellàta,** Schkuhr. (Pl. 6, fig. 11 – 14.) Low, growing in small and dense mats (1 – 3′ across); leaves short and often stiff (2 – 6′ long), flat, the earliest very narrow but the later often 2″ broad; spikes all on separate scapes which rarely exceed 1 – 2′ in length (or rarely one or two short true culms), usually densely aggregated at the surface of the ground and hidden by the leaves, the pistillate spikes green or tawny and rather loosely few-flowered; perigynium slenderly beaked, toothed, very lightly pubescent, about the length of the acute and often rough-tipped scale. — Dry banks and knolls, N. Eng.

to N. J. and N. Y., and perhaps farther westward; infrequent. — Var. VÍCINA, Dewey. Tufts looser and larger; leaves longer (often 1° or more) and laxer, sometimes broader; some pistillate spikes borne near the base of the staminate on a true culm which is 3 – 8′ high, one or two on each culm. With the species and farther westward; infrequent.

91. **C. nìgro-marginàta,** Schwein. Leaves mostly stiffer than in n. 90, often broader, and some of the culms prolonged; perigynium smooth or nearly so, shorter beaked; scales purple-margined, giving the spikes a very dark or variegated appearance, considerably larger and longer than in the last. — Dry hillsides, N. J., and southward; local.

∗ 7. — ← 3. *Triquétræ.*

92. **C. pubéscens,** Muhl. Strict, 1 – 2° high, pubescent throughout; leaves flat and soft, shorter than the culm; spikes 2 – 4, the lower 1 or 2 short-peduncled, and about ½′ long, loosely flowered, erect; perigynium very hairy, conspicuously beaked and minutely toothed, straight, about the length of the truncate and rough-cuspidate thin scale. — Copses and moist meadows, N. Eng. to Ky., and westward; frequent.

∗ 8. PHYLLOSTÁCHYÆ.

93. **C. Jamèsii,** Schwein. (Pl. 5, fig. 17 – 21.) Diffuse, 6 – 10′ high; leaves very narrow (1″ or less), much surpassing the culm; spike very small, the staminate portion inconspicuous, the pistillate flowers 1 – 3 and loosely disposed; perigynium globular, produced into a very long and roughened nearly entire beak; scale narrow, the lowest often 1 – 2′ long, the upper often shorter than the perigynium. (C. Steudelii, *Kunth.*) — Woods, N. Y. to Ill., and southward; frequent.

94. **C. Willdenòvii,** Schkuhr. Lower, stiffer, the leaves broader and pale; spike larger, the pistillate flowers 3 – 9, compact; perigynium bearing a prominent two-edged very rough beak; scales chaffy, nerved, as broad as and somewhat longer than the perigynium, or the lowest rarely overtopping the spike. — Copses, Mass. to Mich., and southward; rare.

95. **C. Báckii,** Boott. Forming dense mats; leaves still broader (2″ or more), very abundant; staminate flowers about 3; pistillate 2 – 5; perigynium more gradually beaked, smooth throughout; scales very broad and leaf-like, all exceeding the culm and entirely enveloping the spike. — W. Mass. to Ohio, and far westward; local and rare, especially eastward.

∗ 9. LEPTOCÉPHALÆ.

96. **C. polytrichoìdes,** Muhl. Capillary, erect or slightly diffuse, 6 – 18′ high; leaves mostly shorter than the culm; spike 2 – 4″ long, linear, the staminate portion very small; perigynium thin and green, nerved, about twice longer than the obtuse caducous scale. — Bogs; common.

∗ 10. PHYSOCÉPHALÆ.

97. **C. Fràseri,** Andrews. Cespitose; culm 6 – 15′ high, naked or the lower portion included in loosely sheathing abortive leaves, smooth and stiff; leaves 1′ broad or more, destitute of midrib, very thick and persistent, pale, 1 – 2° long; spike whitish; perigynium ovoid, faintly nerved, much longer than the scale. — Rich mountain woods, Va. and southward; very local and rare. A most remarkable plant.

§ 2. VÍGNEA. — * 11. ACROARRHÈNÆ. — ⊢ 1. *Fœtidæ*

98. **C. chordorhìza,** Ehrh. Very extensively stoloniferous; culm mostly erect, 1 – 1½° long; leaves involute, shorter than the culm; perigynium globular, very strongly nerved, short-pointed and entire, about the length of the acute scale. — Cold bogs and soft lake-borders, Vt. to Iowa, and northward; infrequent. (Eu.)

99. **C. stenophýlla,** Wahl. Stiff, 3 – 8′ high; leaves involute and shorter than the culm; perigynium ovate, flat on the inner face, lightly nerved, gradually contracted into a short and entire rough-edged beak, tightly enclosing the achene, at maturity longer than the hyaline acutish scale. — Dry grounds, Thayer Co., Neb. (*Bessey*); Emmet Co., Iowa (*Cratty*), and westward. (Eu.)

* 11. — ⊢ 2. *Vulpìnæ.*

++ *Beak shorter than or about as long as the body of the perigynium.*

100. **C. conjúncta,** Boott. Strict but rather weak, 1½ – 3½° high; culm soft and sharply triangular or nearly wing-angled, becoming perfectly flat when pressed; leaves soft, about 3″ broad; head 1 – 3′ long, interrupted, often nearly green, infrequently bearing a few setaceous bracts; perigynium lance-ovate, light colored, whitish and thickened below, the beak lightly notched and roughish, about equalling or a little exceeding the cuspidate scale. — Swales and glades, N. J., Ky., and westward; usually rare.

++ ++ *Beak twice the length of the body of the perigynium or longer.*

101. **C. stipàta,** Muhl. Stout, 1 – 3° high, in clumps; culm rather soft, very sharp; head 1 – 3′ long, rarely somewhat compound at base, interrupted, the lowest spikes often ½′ long; perigynium lanceolate, brown-nerved, the beak toothed and roughish, about twice the length of the body, and much longer than the scale. — Swales; common and variable.

102. **C. crus-córvi,** Shuttlew. Stout, glaucous, 2 – 3° high; culm rough, at least above; leaves flat and very wide; head much branched and compound, 3 – 6′ long; perigynium long-lanceolate, the short base very thick and disk-like, the roughish and very slender beak thrice the length of the body or more, 3 – 4 times the length of the inconspicuous scale. — Swamps, S. Minn to Neb. and Ky., and southward; rare northward.

* 11. — ⊢ 3. *Multiflòræ.*

++ *Spikes conspicuously panicled.*

103. **C. decompósita,** Muhl. Stout, exceedingly deep green, 1½ – 3° high, in stools; culm very obtusely angled, almost terete below; leaves firm, channelled below, longer than the culm; head 2 – 4′ long, the lower branches ascending and 1 – 2′ long; perigynium very small, round-obovate, few-nerved, hard and at maturity shining, the abrupt short beak entire or very nearly so; scale acute, about the length of the perigynium. — Swamps, N. Y. to Mich., and southward; local.

++ ++ *Spikes in a simple or nearly simple head.*

= *Leaves very narrow* (1″ *broad or less*), *becoming more or less involute.*

104. **C. teretiúscula,** Gooden. Slender but mostly erect, 1½ – 2½° high, in loose stools; culm rather obtuse, rough at the top, mostly longer than the leaves; head 1 – 2′ long, compact or somewhat interrupted, narrow (¼′ wide or

less); perigynium very small, ovate and truncate below, bearing a few inconspicuous short nerves on the outer side, stipitate, firm and at maturity blackish and shining, the short beak lighter colored; scale chaffy and acute, about the length of the perigynium. — Swales, N. Eng. to Penn., and westward; common. (Eu.) — Var. RAMÒSA, Boott. More slender; head mostly longer, the upper portion often somewhat nodding, the spikes scattered and the lowest ones often slightly compound. N. Y., and westward; common.

= = *Leaves broader and flat* (*occasionally involute in* n. 106).

a. *Scales very sharp, mostly rough-tipped.*

1. *Perigynium large* (2″ *long or more*), *nerveless on the inner face.*

105. **C. alopecoídea,** Tuckerm. Stout but rather soft, 2 – 3° high; culm rather sharp, thick and soft in texture; leaves 2 – 3″ wide, about the length of the culm, very green; head 1½′ long or less, sometimes green, and occasionally a little compound, the spikes many and compactly or somewhat loosely disposed or the lowest often separate and all mostly short-oblong; perigynium ovate, tapering into a rough beak, very prominently stipitate, with a few brown nerves on the outer face, ascending, about equalling or a little exceeding the scale. — Open swales, N. Y., Penn., and Mich.; local. In aspect like n. 101.

Var. **sparsispicàta,** Dewey. Weak, the leaves much narrower and lax; head 1 – 3′ long and linear or nearly so, the spikes smaller and separated or scattered. — S. E. Mich. (*Cooley, Clark*); little known.

106. **C. grávida,** Bailey. Lower and the culm thinner and more sharply angled, 1 – 2° high; leaves rather narrower and firmer, shorter than the culm; head short, always simple, globular or short-oblong, the lowest spikes rarely distinct; spikes few (4 – 7), globular, or broader than long; perigynium broadly ovate, nearly twice larger, sessile, plump and somewhat polished at maturity, prominently spreading. — N. Ill. to Iowa and Neb. — Var. LAXIFÒLIA, Bailey. Much larger, 2 – 3½° high; leaves broader (about ¼′) and lax; head large and dense, ovoid or oblong, scarcely interrupted. N. Ill. to Dak.

2. *Perigynium very small, mostly nerved on the inner face.*

107. **C. vulpinoídea,** Michx. Mostly rather stiff, 1 – 2½° high; culm very rough, at least above; leaves various, mostly flat and longer than the culm; head 1 – 4′ long, usually much interrupted and frequently somewhat compound, varying from dull brown to almost green at maturity, commonly provided with many very setaceous short bracts; spikes very numerous, ascending and densely flowered; perigynium ovate or lance-ovate, mostly ascending. — Low places, variable; very abundant, especially northward.

b. *Scales blunt, smooth and hyaline-tipped.*

108. **C. Sartwéllii,** Dewey. Stiff and strict, 1½ – 2½° high; leaves produced into a long slender point, mostly shorter than the culm; staminate flowers variously disposed, frequently whole spikes being sterile; head 1 – 3′ long and rather narrow, the individual spikes usually clearly defined, or occasionally the head interrupted below, tawny-brown; perigynium elliptic or lance-elliptic, nerved on both sides, very gradually contracted into a short beak; scale about the length of the perigynium. (C. disticha, last ed.) — Bogs, central N. Y., west and northward; frequent.

∗ 11. — ⊹ 4. *Arenàriæ.*

**C. arenària**, Linn. Extensively creeping, 1° high or less; leaves very narrow and very long-pointed, shorter than the culm; head about 1′ long, dense or sometimes interrupted, ovoid or oblong; spikes few to many, those at the apex of the head usually staminate, the intermediate ones staminate at the summit, the lowest entirely pistillate and subtended by a bract about 1′ long; perigynium very strongly nerved on both faces, wing-margined above, sharply long-toothed, about the length of the scale. — Sea-beaches near Norfolk, Va. (*McMinn*). (Adv. from Eu.)

∗ 11. — ⊹ 5. *Muhlenbergiànæ.*

⊹⊹ *Heads narrow, the spikes scattered (or often aggregated in* C. muricata.)

= *Perigynium almost terete.*

109. **C. tenélla,** Schkuhr. Exceedingly slender, 6′–2° high, in tufts; leaves flat, soft, and weak, mostly shorter than the culm; spikes 1–3-flowered, or the terminal 4–6-flowered, all distinct and scattered on the upper part of the culm, the bracts obsolete or the lowest present and very short; perigynium elliptic-ovate, very plump, finely nerved, the minute beak entire, longer than the white scale, usually at length splitting and exposing the blackish achene. — Cold swamps, N. Eng. to Penn., and far westward; common. (Eu.)

= = *Perigynium flattish.*

110. **C. ròsea,** Schkuhr. Always slender and weak, erect, 1–2½° high, exceeding the narrow leaves; spikes 5–8, 6–14-flowered, the upper 3–4 aggregated, the others 3–9″ apart, the lowest usually with a setaceous bract; perigynium lance-ovate, thin and shining, nerveless, scarcely margined, rough on the edges above, perfectly squarrose, very green, about twice longer than the translucent white scale. — Rich woods, N. Eng. to Minn. and Neb.; frequent. — Var. radiàta, Dewey. Lower and much more slender, the culms sometimes almost capillary; spikes 2–5, scattered, 2–4-flowered; perigynium mostly narrower and more ascending. Open places and drier woods; common.

Var. **Texénsis,** Torr. Very slender but strict, 1° high or less; spikes 3–4, all contiguous or the lower ones approximate, 2–6-flowered; perigynium lanceolate, the base prominently spongy, smooth or nearly so, conspicuously divaricate. — Dry places, S. Ill. (*Schneck*), and southward.

Var. **retrofléxa,** Torr. Often rather stiff, 1–1½° high; spikes 4–8, the upper ones aggregated, the lower 1 or 2 separated and commonly subtended by a conspicuous bract, often brownish; perigynium ovate, smooth throughout, very prominently corky and swollen at the base, which is frequently contracted almost to a stipe, at maturity usually widely spreading or reflexed; scale brownish and sharp, at length deciduous. (C. retroflexa, *Muhl.*) — Copses, throughout; rare northward.

111. **C. sparganioìdes,** Muhl. Stouter, stiff; culm 2–3° high; leaves very broad (usually ¼′ or more) and flat, their sheaths conspicuously clothing the base of the culm; spikes 6–10, the 2 or 3 upper ones contiguous, the remainder entirely separate, very green, oblong or short-cylindric, the lowest often compound, all truncate at top; perigynium ovate, wing-margined, rough on the short beak, often obscurely nerved on the outer face, considerably longer than the rough-pointed scale. — Rich woods; frequent.

**C. muricàta**, L. Culm 1–2° high, rough, longer than the narrow leaves; spikes 5–10, variously disposed, but usually some of them scattered, frequently all aggregated, rarely tawny; perigynium heavy, ovate, thin and shining, nerveless, the long beak minutely rough, spreading, a little longer than the sharp green or brownish scale. — Dry fields, E. Mass., where it is common, and sparingly south and westward to Va. and Ohio. (Nat. from Eu.)

++ ++ *Heads short-oblong or globular, the spikes all aggregated, or only the lowest one or two separate.*

= *Plant very stiff throughout.*

112. **C. Muhlenbérgii,** Schkuhr. Pale, growing in small tufts, 1 - 2½° high; culms much prolonged beyond the few narrow and at length involute leaves; head ¾′ long or less, the individual spikes clearly defined; spikes globular, 4 - 8; perigynium nearly circular, very strongly nerved on both faces, broader than the rough-cuspidate scale and about as long. — Open sterile soils; frequent. — Var. ENÉRVIS, Boott. Perigynium nearly or entirely nerveless. Southeastern N. Y., and southward; rare.

= = *Plant strict but not stiff.*

113. **C. cephaloídea,** Dewey. Lax, very green, 2 - 3° high; leaves broad (2 - 3″) and thin, shorter than the long culm; head rather loose, ¾′ long or more, all but the very uppermost spikes clearly defined; perigynium ovate, entirely nerveless, long rough-pointed, spreading, twice longer than the very thin scale or more. — Shady banks, W. Mass. to Mich.; frequent.

114. **C. cephalóphora,** Muhl. Mostly smaller and stricter, pale; leaves half as wide or less; head small, rarely ½′ long, globular or very short-oblong, never interrupted, the lower 1 or 2 spikes usually bearing a very setaceous short bract; perigynium twice smaller than in the last, scarcely longer than the rough-cuspidate scale. — Dry and mostly sterile knolls; common.

Var. **angustifòlia,** Boott. Low, 8′ high or less; leaves very narrow; head smaller, usually tawny; perigynium mostly broader. — West and southward; rare.

* 11. — + 6. *Diòicæ.*

++ *Perigynium nerveless or very nearly so.*

115. **C. capitàta,** L. Rigid, 3′ - 1° high; leaves filiform, shorter than the culm; head globular, uniformly staminate above, brown, very small; perigynium broadly ovate, very thin, whitish, prominently beaked, erect and appressed, longer than the very thin and obtuse scale. — Alpine summits of the White Mountains. (Eu.)

++ ++ *Perigynium prominently nerved.*

116. **C. gynòcrates,** Wormsk. Stiff but very slender, 3 - 6′ high, diœcious; leaves filiform and setaceous, about the length of the culm; spike oblong, 2 - 4″ long; perigynium elliptic-ovate, nearly terete, stipitate, widely spreading or reflexed at maturity, 1 or 2 sometimes borne at the base of the staminate spike. — Cold sphagnum swamps, Penn., north and westward; local, particularly southward.

117. **C. exìlis,** Dewey. Very stiff, slender, 1 - 2° high; leaves involute-filiform and very stiff, shorter than the culm; spike varying from almost globular to cylindrical (frequently 1′ long), either unisexual or the sexes variously placed, very rarely a supplementary spike at base; perigynium elliptic-ovate, flattish, stipitate and somewhat cordate at base, strongly brown-nerved

on the outer face, rather faintly nerved on the inner, rough-edged above, sharply toothed, spreading, a little longer than the scale. — Cold swamps and lake-borders, N. Eng. and eastern N. Y. to N. J.; rare.

∗ 12. Hyparrhènæ. — ⫨ 1. *Elongàtæ.*

*⫨ Perigynium very sharp-margined, firm, often thickened at base, spreading in open and at maturity stellate spikes.*

118. **C. echinàta,** Murray, var. **cephalántha,** Bailey. Rather stiff but slender, 1 – 2° high; leaves very narrow and involute, about the length of the culm; spikes 5 – 8, approximate or even aggregated into a head, green, compactly 15 – 30-flowered, short-oblong or nearly globular; perigynium ovate-lanceolate, rough on the margins above, nerved on both faces, spreading or reflexed at maturity, the beak long and prominent, longer than the sharp white scale. (C. stellulata, last ed.) — E. Penn. (*Porter*) to Mass. (*Morong*), and westward to L. Superior; rare. — Var. conférta, Bailey. Very stiff; spikes contiguous or scattered, spreading, short-oblong or globular, dense; perigynium broadly ovate or even nearly round-ovate, very strongly nerved, reflexed or widely spreading. Near the sea-coast; uncommon. The perigynia resemble those of n. 112. — Var. micróstachys, Boeckl. Mostly very slender; spikes few, 3 – 10-flowered, usually tawny; perigynium small, lance-ovate, nerved on the outer face but usually nerveless on the inner, erect or spreading, the beak rather long or prominent. (C. scirpoides, *Schkuhr.* C. sterilis, *Willd.*) Swales, throughout; very common and variable. — Var. angustàta, Bailey. Exceedingly slender; spikes few and very few-flowered, mostly all contiguous; perigynium lanceolate or linear-lanceolate, twice the length of the scale or more. N. Y., Vt., and northward; rare.

*⫨ ⫨ Perigynium scarcely sharp-margined, thin in texture, not thickened at base, mostly in closely flowered and rounded or oblong spikes.*

*= Perigynium ovate or nearly so, the beak short or none.*

a. *Bracts not prolonged.*

119. **C. canéscens,** L. Stiff and rather stout, 1 – 2½° high, glaucous and pale throughout, growing in stools; spikes 4 – 8, globular or oblong, very densely 20 – 50-flowered, approximate or somewhat scattered on the upper part of the culm, usually prominently contracted below with the staminate flowers; perigynium short-ovate, silvery-white and minutely puncticulate, never thickened at base, faintly few-nerved, smooth throughout, ascending, the beak very short and entire; scale obtuse or acutish, about the length of the perigynium. — Cool swamps and bogs, N. Eng. to Penn., west and northward; frequent northward. (Eu.)

Var. **vulgàris,** Bailey. Very slender, lower, not glaucous, in small and loose tufts; spikes smaller and usually fewer, loosely flowered; perigynium mostly more beaked, prominently spreading. — Mostly in drier places; very common. Perigynium much shorter than in any form of n. 118.

Var. **alpícola,** Wahl. Low and stiff, or at lower altitudes becoming somewhat slender, seldom much over 1° in height; spikes small, globular or nearly so, dense, well defined and brown or tawny; perigynium as in the type, ascending. (C. vitilis, *Fries.*) — Mountains from N. Eng. to Ga., sparingly along our northern boundary, and far westward. (Eu.)

Var. **polystàchya,** Boott. Erect and mostly strict, not glaucous, 1½ – 2½° high, scarcely tufted; leaves very lax and exceeding the culm; spikes oblong, more or less aggregated in an oblong interrupted head, the lowest 1 or 2 subtended by short scale-like bracts; perigynium somewhat spreading. (C. arcta, *Boott.*) Low woods, N. New Eng. to N. Minn.; rare. Resembles C. echinata, var. cephalantha.

120. **C. Norvégica,** Willd. Low and stiff, but rather slender, 1° high or less; leaves very narrow, mostly shorter than the culm; spikes 3 – 5, somewhat scattered, brown, globular or oblong, compactly many-flowered, the terminal one long-contracted below with the staminate flowers; perigynium very short-ovate, thick, the beak rough, a little longer than the very obtuse scale. — Salt marshes, Maine, and northward, rare. (Eu.)

121. **C. tenuiflòra,** Wahl. Very slender and diffuse, 1 – 1½° high, in tufts; leaves very narrow and lax, shorter than the filiform culm; spikes 2 – 4, all loosely few-flowered and silvery-green, and aggregated into a small globular head; perigynium elliptic, obscurely nerved, smooth, beakless, spreading, about the length of the white thin scale. — Bogs, N. New Eng. to N. Minn.; local. (Eu.)

b. *Bracts much prolonged, the lowest 2 – 3′ long.*

122. **C. trispérma,** Dewey. (Pl. 6, fig. 1 – 5.) Exceedingly slender, in small and loose tufts, the weak reclining culms 1 – 2° long; leaves soft and narrow, shorter than the culm; spikes 2 – 3, 1 – 3′ apart, silvery-green, 2 – 3-flowered; perigynium very thin, finely nerved, the beak entire or nearly so; scale acute, very thin, usually shorter than the perigynium. — Cold bogs, throughout; common northward.

= = *Perigynium ovate-lanceolate to linear-lanceolate.*

123. **C. Deweyàna,** Schwein. Weak, 1 – 1½° high; leaves flat and soft, shorter than the culm, yellowish-green; spikes 3 – 6, mostly oblong or sometimes but 2 – 3-flowered, loose, the upper ones contiguous but the lower 1 or 2 usually considerably separated on the zigzag rhachis and mostly subtended by a bract, all silvery-green; perigynium ovate-lanceolate or narrower, very thin in texture, nerveless, somewhat thickened below on the outer face, the long beak rough; scale very thin, acute or cuspidate, about the length of the perigynium. — Dry woods; common.

124. **C. bromoìdes,** Schkuhr. Lax, 1 – 2° high, in dense stools; leaves very narrow, about as long as the culm; staminate flowers variously situated in the head, sometimes a few spikes wholly sterile, rarely the plants diœcious; spikes 3 – 6, oblong or short-cylindric, erect, silvery-tawny or brown; perigynium linear-lanceolate, firm especially at the base, prominently nerved, the long and roughened beak toothed; scale sharp, shorter than the perigynium. — Open bogs; common.

∗ 12. — ⊷ 2. *Ovàles.*

⊷ *Perigynium ovate-lanceolate, with winged margins.*

125. **C. siccàta,** Dewey. Extensively creeping, 1 – 2° high, erect; leaves firm, narrow, about the length of the culm; staminate flowers variously situated, usually some of the spikes wholly sterile; spikes 3 – 5, aggregated or separated, ovoid or short-oblong, silvery-brown; perigynium firm, nerved on

both faces, the long beak rough and toothed, the margins prominent or sometimes very narrow; scale acute, about the length of the perigynium. — Sandy fields and banks, N. Eng. to Ohio, west and northward; frequent.

++ ++ *Perigynium ovate-lanceolate or narrower, scale-like, with little distinction between body and margin.*

126. **C. Muskinguménsis,** Schwein. Robust, erect, 2 – 3° high; leaves many and lax, loosely sheathing, those on the sterile shoots crowded near the top, all flat and long-pointed; spikes 6 – 12, contiguous, erect, narrowly cylindric (often 1′ long), becoming light brown and presenting a dried appearance, very densely flowered; perigynium linear-lanceolate (3″ long), prominently nerved, ciliate on the white margins above, appressed, twice the length of the scale or more. (C. arida, *Schwein. & Torr.*) — Woods and copses, Mich. and Ohio to Ill. and Wisc.; local.

127. **C. tribuloìdes,** Wahl. Stout and erect, 2 – 3° high; leaves narrower than in the last, loosely sheathing; spikes 6 – 15, aggregated into an oblong or somewhat interrupted heavy head, short-oblong or sometimes nearly globular, green or tawny-green, compact, not narrowed above; perigynium linear-lanceolate (3″ long), obscurely nerved, erect but the points conspicuous, rough-margined, nearly twice the length of the scale. (C. lagopodioides, *Schkuhr.*) — Open swales; frequent. — Var. TURBÀTA, Bailey. Culm softer and often lax; the leaves broader; spikes more loosely disposed, forming a head 1 – 2′ long, which is slender and more or less interrupted but always erect, green, becoming tawny, if at all, only when the perigynia begin to fall, obovate-oblong (¼ to rarely ½″ long), contracted below; perigynium ascending and more appressed, the points therefore not conspicuous. Woods, throughout; rare. — Var. REDÚCTA, Bailey. Very slender, 1 – 2° high, the culm projecting beyond the leaves; spikes 2 – 10, small and nearly globular (usually less than 3″ broad), all usually distinct, the lowest separated, brown, especially at maturity, the head often flexuose; perigynium small, the points spreading and conspicuous. Copses, N. Eng. to Dak.; infrequent.

Var. **Bébbii,** Bailey. Stiff or rather slender, erect, 1 – 2½° high; head dense, ovoid or oblong (¼ – ¾′ or very seldom 1′ long), the lowest spike only rarely distinct, straw-colored; spikes small (3″ long or less), their axes ascending; bracts at the base of the head small or none; points of the small perigynium conspicuous. (C. Bebbii, *Olney.*) — Dry low grounds, throughout; common.

Var. **cristàta,** Bailey. Stout and stiff, 1½ – 3° high; head more or less open or at least the lower 1 or 2 spikes commonly distinct, 1′ long or more, green; spikes larger than in the last and almost exactly globular, their axes more divergent or fully horizontal; bracts usually conspicuous, sometimes one of them foliaceous; perigynium spreading, the points more conspicuous. (C. cristata, *Schwein.*) — Moist ground, throughout from Penn. northward; common.

128. **C. scopària,** Schkuhr. Rather slender but erect, 1 – 2½° high; leaves very narrow, shorter than the culm; head short and comparatively thick, always tawny or brown, bractless or nearly so; spikes 3 – 8, all contiguous or bunched, ovate-oblong, always prominently narrowed or cone-shaped above, ascending; perigynium as in n. 127, but erect or ascending. — Open swales, throughout; common eastward.

Var. **minor,** Boott. Much smaller, 6 – 10′ high, the leaves very narrow; head very small and darker brown; spikes very small (2 – 4″ long). — Rocky and sterile places, northward; frequent.

++ ++ ++ *Perigynium ovate or broader, thickened in the middle, wing-margined (in* n. 129 *marginless).*

= *Head silvery-brown, silvery-green, or silvery-whitish.*

129. **C. adústa,** Boott. Very stiff and stout, 1½ – 2½° high, in dense tufts; head very heavy, erect, varying from globular to oblong, silvery-brown; spikes 5 – 10, globular and heavy, all aggregated or sometimes distinct, the lowest 1 or 2 subtended by a short and very broad-based, nerved and pointed bract; perigynium broadly ovate, wingless or very nearly so, plump, shining, nerved on the outer face but nerveless on the inner, filled by the large achene; scale acute, about the length of the perigynium. (C. pinguis, *Bailey.*) — Dry and mostly hard soils, Mt. Desert, Maine (*Greenleaf*), and northward, and Crawford Co., Mich. (*Bailey*), to N. Minn., and far northwestward; local.

130. **C. fœ̀nea,** Willd. Slender, erect or the top of the culm flexuose, 1 – 2° high; head long and weak, often nodding; spikes 5 – 8, small, nearly globular and much contracted below, silvery-green, alternately disposed; perigynium varying from ovate to long-ovate, very thin, much longer than the small achene, prominently rough-margined, strongly many-nerved on both faces, especially on the small inner face; bracts entirely wanting or inconspicuous. (C. adusta, last ed.) — Dryish copses, N. Eng. to Penn. and Minn.; not common. — Var. PERPLÉXA, Bailey. Mostly taller and stouter; spikes larger and less attenuated or even truncate below, approximate or even aggregated, the head erect or nearly so and the lowest bract occasionally prominent; perigynium thicker and firmer in texture. N. Eng. to Minn.; infrequent.

131. **C. silícea,** Olney. Stiff, 1 – 2° high, in clumps; leaves very narrow, becoming involute, not exceeding the culm; head 1 – 3′ long, usually flexuose or nodding above the middle at maturity; spikes 5 – 8, silvery-white or silvery-tawny at full maturity, all more or less separated, ovate, conspicuously contracted below and cone-shaped above, erect on the culm; perigynium very broad-ovate and very thin, obscurely nerved, appressed, about as long as the acute colorless scale. (C. fœnea, var. sabulonum, last ed.; C. straminea, var. moniliformis, *Tuckerm.*) — Sands of the sea-shore, Maine to N. J.; frequent.

= = *Head dull brown or green (usually somewhat silvery in* var. fœnea *of* n. 132).

132. **C. stramínea,** Willd. Very slender, erect, but the top of the culm often flexuose, 1 – 3° high; leaves narrow and long-pointed, stiff, shorter than the culm; spikes 3 – 8, tawny, very small (2 – 3″ broad), globular or sometimes a little tapering below from the presence of many staminate flowers, usually all entirely distinct on the very slender, often zigzag or flexuose rhachis; bracts none, or only the lowest conspicuous; perigynium small and ovate, nerved on both faces but never unusually prominently nerved on the inner face (as is the perigynium of n. 130), the points spreading and rather conspicuous; scale acute, about the length of the perigynium. (C. straminea, var. tenera, last ed.) — Dryish copses and fields; common. Immensely variable.

Var. **mirábilis,** Tuckerm. Culm long and mostly weak, often 4° high, much longer than the loose leaves; spikes 4 – 8, larger, usually all contiguous or occasionally the lowest 1 or 2 separate, spreading, loosely flowered, tawny or frequently greenish; perigynium narrowly ovate, thin, longer than the scale, the points much spreading and very conspicuous. (C. mirabilis, *Dewey.*) — Shady places, throughout; frequent.

Var. **brèvior,** Dewey. (Pl. 6, fig. 6 – 10.) Culm always stiff, 1½ – 2½° high, longer than the stiff long-pointed leaves; spikes 3 – 8, all distinct, contiguous or more or less separated, large (3 – 5″ broad), globular, the head always short and erect; perigynium orbicular or ovate-orbicular, often cordate at base, mostly very broadly winged. (C. straminea, and vars. typica, hyalina, and Meadii, last ed.) — Dry soils, throughout; common.

Var. **apérta,** Boott. Culm slender but strict below the head, 1 – 2° high, growing in dense tufts; leaves very narrow, usually much shorter than the culm; spikes 4 – 6, large, heavy, much contracted below, usually all separated, becoming rusty, disposed in a weak or nodding head; perigynium narrowly ovate. — Bogs, throughout; rare westward. Transition to n. 128, from which the ovate perigynia distinguish it.

Var. **invìsa,** W. Boott. Culm very slender, weak above; leaves very narrow with exceedingly long thin points, about the length of the culm; spikes small (3″ broad or less), ovate, variously disposed in dense or open heads or sometimes the lowest remote or even subradical, rusty, the lower ones subtended by filiform bracts 2 – 5′ long. — Swales near the sea-board, Maine to Del.; infrequent. Apt to be confounded with n. 128.

Var. **alàta,** Bailey. Culm very stiff, 1½ – 3° high, longer than the stiff leaves; spikes very large, oblong or conical, always pointed, usually all contiguous, green or sometimes becoming tawny; perigynium orbicular or orbicular-obovate, very abruptly contracted into a short beak which is prominent in the spike. (C. alata, *Torr.*) — Swales, Mass. to Ill., and southward; rare and uncharacteristic far inland.

Var. **cumulàta,** Bailey. Culm very stiff, 2 – 3° high, greatly exceeding the firm leaves; spikes 5 – 30, all aggregated or densely capitate, green, widely divergent, pointed above, very abruptly contracted or even truncate at base, very densely flowered; perigynium small, broad, very obscurely nerved, the points inconspicuous.—Dry grounds, Penn. to N. Eng., and northward; rare.

Var. **fœnea,** Torr. Culm very stiff, longer than the leaves, 1 – 2° high; spikes 4 – 8, contiguous or separated, never densely aggregated, prominently contracted both above and below, very densely flowered, green, or often silvery-green. (C. fœnea, last ed., excl. vars.; not *Willd.*) — Near the sea-coast; frequent.

**C.** LEPORÌNA, L. Distinguished from C. straminea, var. brevior, as follows: — Usually lower; spikes rusty-brown, ovoid or oblong, erect or appressed, more or less contracted both above and below, contiguous in an interrupted head 1′ long or less; perigynium lance-ovate, thin, very narrowly margined, erect and appressed, obscurely nerved. — About Boston (*W. Boott, Morong*). (Adv. from Eu.)

∗ 12. — ← 3. *Cyperoideæ.*

133. **C. sychnocéphala,** Carey. Erect, 3 – 18′ high, leafy; head ½ – 1′ long; perigynium very slender, faintly nerved, 5 – 6 times longer than the exceedingly small achene, mostly a little longer than the sharp scale. — Glades, central N. Y. to Minn., and far westward; rare.

## ORDER 129. GRAMÍNEÆ. (GRASS FAMILY.)

*Grasses, with usually hollow stems* (culms) *closed at the joints, alternate 2-ranked leaves, their sheaths split or open on the side opposite the blade; the hypogynous flowers solitary in the axils of imbricated 2-ranked glumes*, forming a 1 – many-flowered *spikelet;* the lower glumes (1 or usually 2) empty, the succeeding *flowering glumes* enclosing each a somewhat smaller and usually thinner scale (called the *palet*) and 2 or 3 very minute hyaline scales (*lodicules*) at the base of the flower. Stamens 1 – 6, commonly 3; anthers versatile, 2-celled, the cells distinct. Styles mostly 2 or 2-parted; stigmas hairy or feathery. Ovary 1-celled, 1-ovuled, forming a seed-like grain (*caryopsis*) in fruit. Embryo small, on the outside and at the base of the floury albumen. — Roots fibrous. Sheath of the leaves usually more or less extended above the base of the blade into a scarious appendage (*ligule*). Spikelets panicled or spiked. Palet usually 2-nerved or 2-keeled, enclosed or partly covered by the glume. Grain sometimes free from, sometimes permanently adherent to, the palet. — A vast and most important family, as it furnishes the cereal grains, and the principal food of cattle, etc. The terms *flowering glume* and *palet* are now adopted in place of the *outer* and *inner palets* of previous editions, while for convenience the term flower is often retained for the flower proper together with the enclosing flowering glume. (See Plates 7 – 15.)

SERIES A. Spikelets jointed upon the pedicel below the glumes, of one terminal perfect flower (sometimes a lower staminate or neutral flower in n. 5), or some or all of the 1-flowered spikelets unisexual in n. 10 – 12. Glumes 4 (rarely only 2 or 3).

**Tribe I. PANICEÆ.** Spikelets of one perfect flower, in spikes or panicles. Flowering glume awnless, in fruit more rigid than the empty glumes.

* Spikelets in 2 – 4 ranks on a more or less flattened rhachis. — See also n. 5 (§ Digitaria).

+ Rhachis produced beyond the upper spikelet; glumes 3.

1. **Spartina.** Spikelets much flattened laterally in 2 close ranks.

+ + Rhachis not produced above the upper spikelet (rarely in n. 3).

2. **Beckmannia.** Spikelets obovate, in 2 close rows. Glumes 3 (or 4), strongly concave, carinate.
3. **Paspalum.** Spikelets plano-convex, sessile or nearly so. Glumes 3 (rarely 2).
4. **Eriochloa.** Spikelets plano-convex, lanceolate, with a basal callus, short-pedicelled.

* * Spikelets irregularly paniculate or spicate.

5. **Panicum.** Spikelets ovate, not involucrate nor the pedicels bristly. Glumes 4, the lowest usually small or minute.
6. **Setaria.** Spikelets in dense cylindrical spikes or panicles, the pedicels bristle-bearing.
7. **Cenchrus.** Spikelets (1 – 5) enclosed in a globular spiny bur-like involucre.
8. **Amphicarpum.** Spikelets of 2 kinds, one in a terminal panicle, the other subterranean on radical peduncles.

**Tribe II. ORYZEÆ.** Spikelets unisexual or perfect, in loose panicles, with only 2 glumes (in our genera) and palet none. Stamens often 6.

9. **Leersia.** Flowers perfect. Spikelets much flattened. Glumes carinate.
10. **Zizania.** Spikelets unisexual. Glumes convex, narrow.

**Tribe III. MAYDEÆ.** Spikelets of a single perfect or unisexual or rudimentary flower, in jointed spikes, in pairs at each joint, mostly imbedded in the thick rhachis.

11. **Tripsacum.** Spikelets monœcious, the staminate above in the spike.
12. **Rottbœllia.** One spikelet of each pair sterile and shortly pedicelled, the other fertile, sessile and sunk in the rhachis.

**Tribe IV. ANDROPOGONEÆ.** Spikelets in pairs or threes on the (usually jointed and bearded) rhachis of a spike or branches of a panicle, one sessile and fertile, the lateral pedicelled and often sterile or rudimentary; 2 upper glumes smaller and hyaline, that of the fertile flower mostly awned.

13. **Erianthus.** Spikelets in pairs, spicate, all alike fertile, involucrate with a silky tuft.
14. **Andropogon.** Spikelets spicate, in pairs, the pedicellate sterile or rudimentary; rhachis bearded.
15. **Chrysopogon.** Spikelets in open panicles, in pairs or threes, only the sessile fertile.

Series B. Rhachis of the spikelet usually jointed above the persistent lower glumes (jointed below the glumes only in n. 19, 31, and 36). Spikelets 1–many-flowered, the uppermost flowers often imperfect or rudimentary.

**Tribe V. PHALARIDEÆ.** Glumes 5, only the uppermost fertile, the 2 middle ones rudimentary or empty or staminate; palet 1-nerved. Panicle mostly contracted and spike-like.

16. **Phalaris.** Middle glumes mere rudiments each side of the shining triandrous flower.
17 **Anthoxanthum.** Middle glumes empty, awned on the back. Stamens 2.
18. **Hierochloe.** Middle glumes triandrous. Fertile flower diandrous.

**Tribe VI. AGROSTIDEÆ.** Glumes 3; flower solitary, perfect (rarely a rudimentary or perfect second flower in n. 23 and 32–34); palet 2-nerved.

* Flowering glume with a terminal awn (none in n. 22), closely embracing the grain in fruit; spikelets in panicles or loose spikes, the rhachis not produced beyond the flower (except in n. 24 and a single species of n. 23). — Stipeæ.

+– Fruiting glume firm and indurated, with a callus at base (none in n. 22).

19. **Aristida.** Awn 3-fid, the branches divaricate. Callus acute.
20. **Stipa.** Awn simple, twisted. Callus mostly acute.
21. **Oryzopsis.** Awn simple, straight, deciduous. Flower oblong; callus short, obtuse.
22. **Milium.** Awn none. Flower small, ovoid, without callus.

+– +– Fruiting glume thin and membranous; outer glume smaller or minute.

23. **Muhlenbergia.** Flower mostly hairy at base, the glume mucronate or awned.
24. **Brachyelytrum.** Rhachis produced into a bristle above. Outer glumes very small, the flowering one long-awned. Stamens 2.

* * Flowering glume awnless or short-awned, loosely embracing the grain, thin, the lower glumes complicate-carinate; spikelets in dense spike-like panicles, the rhachis not produced. — Phleoideæ.

25. **Heleochloa.** Awns none. Spikes short and scarcely exserted.
26. **Phleum.** Glumes somewhat truncate, mucronate or short-awned. Spike cylindric.
27. **Alopecurus.** Lower glumes united at base, the flowering awned on the back. Palet none. Spike cylindric.

* * * Glumes membranous, the lower rarely strongly complicate, the flowering with a dorsal awn or awnless; spikelets variously panicled. — Agrosteæ.

+– Flowering glume 1- (rarely 3-) nerved, awnless; grain loosely enclosed or naked.

28. **Sporobolus.** Culms wiry or rigid. Leaves involute.

+– +– Flowering glume 3–5-nerved, mostly awned; grain enclosed.

++ Rhachis not produced above the single flower.

29. **Agrostis.** Spikelets in an open panicle.
30. **Polypogon.** Empty glumes long-awned. Panicle spike-like.
31. **Cinna.** Spikelets flattened, in a loose panicle. Palet 1-nerved. Stamen 1.

++ Rhachis bearing a rudimentary second flower or short bristle (except in species of n. 33).

32. **Apera.** Flowering glume bifid, awned. Panicle very loose and delicate.
33. **Calamagrostis.** Flowers hairy-tufted at base. Glumes membranaceous. Palet thin.
34. **Ammophila.** Spikelets large. Flowers hairy-tufted at base. Glumes and palet chartaceous.

**Tribe VII. AVENEÆ.** Spikelets 2-several-flowered, panicled, the rhachis or base of the flowers often bearded ; upper flower imperfect or rudimentary (except in n. 37). Flowering glume bearing a twisted, bent or straight awn on its back or below the apex.

* One of the flowers staminate only.

35. **Arrhenatherum.** Lower flower staminate, long-awned ; middle flower perfect, nearly awnless ; the upper rudimentary.
36. **Holcus.** Flowers 2, the lower perfect, awnless, the upper staminate, awned.

* * Flowers all perfect or the uppermost usually rudimentary.

37. **Aira.** Spikelets very small, in a diffuse panicle. Flowers 2, perfect, awned toward the base.
38. **Deschampsia.** Spikelets 2-flowered, with a hairy rudiment. Glumes thin-scarious, the flowering one erose-truncate, awned near the middle.
39. **Trisetum.** Spikelets 2-several-flowered. Flowering glume thin, compressed, carinate, 2-toothed, awned above by the excurrent mid-nerve.
40. **Avena.** Spikelets 2-several-flowered. Flowering glume hard and firm, rounded on the back, 5-9-nerved, the mid-nerve long-excurrent at or below the 2-toothed apex.
41. **Danthonia.** As Avena, but the 3 middle nerves of the flowering glume running into a flattish twisted awn from between the teeth.

**Tribe VIII. CHLORIDEÆ.** Spikelets 2-several-flowered with one or more of the upper flowers imperfect (flower 1 and perfect in n. 45), arranged in 2 rows upon the rhachis of a 1-sided spike.

* Spikelets with one perfect flower.

42. **Cynodon.** Spikes 3-5, slender, digitate. Flower and the rudiment awnless.
43. **Ctenium.** Spike solitary, terminal. Flowers 4-6, the middle one perfect.
44. **Gymnopogon.** Spikes filiform, racemose. Spikelets remote, of a perfect flower and an awned rudiment.
45. **Schedonnardus.** Spikes 3-9, slender, scattered, distant. Spikelets small, 1-flowered, awnless.
46. **Bouteloua.** Spikes scattered (rarely 1 and terminal), dense. Glume of perfect flower 3-toothed. Rudimentary flowers 1-3-awned.

* * Spikelets with two or more perfect flowers ; awns none.

47. **Eleusine.** Spikes digitate, dense.
48. **Leptochloa.** Spikes racemose, slender. Spikelets small, alternate.

* * * Spikelets diœcious ; spikes small, very dissimilar.

49. **Buchloe.** Pistillate spikes capitate, sessile, the spikelets 1-flowered ; staminate spikes (2 or 3) on a peduncle, the spikelets 2-3-flowered.

**Tribe IX. FESTUCEÆ.** Spikelets few-many-flowered, panicled, the uppermost flowers often imperfect or abortive. Glumes pointless or the flowering ones tipped with a straight awn or bristle.

* Flowering glume 1-3-nerved, 2-3-toothed. Rhachis short-bearded or glabrous.

50. **Triodia.** Rhachis of the spikelet bearded. Nerves of the flowering glume 3, villous, at least the middle one more or less excurrent.
51. **Diplachne.** Rhachis glabrous. Glume 1-3-nerved, with 2 small teeth, and a short awn in the cleft.

* * Glume 3-nerved, entire or 2-toothed and mucronate between the teeth. Rhachis and flowers long-villous. Tall reeds with ample panicles.

52. **Phragmites.** Spikelets 3-7-flowered ; lowest flower naked, staminate or neutral. Glume entire.
53. **Arundo.** As n. 52, but flowers all perfect. Glume bifid.

* * * Glume 3-nerved, the nerves (at least the mid-nerve) excurrent; spikelets few, in the axils of floral leaves.

54. **Munroa.** Low or prostrate much-branched annual.

* * * * Glume 3- (rarely 1-) nerved, obtuse or acute, awnless; rhachis and flower naked.

55. **Kœleria.** Panicle contracted. Spikelets 2–4-flowered. Glumes compressed-keeled, acute or mucronate.
56. **Eatonia.** Panicle slender, more or less dense. Spikelets 2-flowered. Glumes very dissimilar, usually obtuse, the upper empty one enclosing the flowers.
57. **Eragrostis.** Spikelets flattened, 2–many-flowered. Glumes acute or acutish. Palet persistent.

* * * * * Glume 3–5-nerved, obtuse or abrupt-cuspidate; spikelet 3–5-flowered; upper sterile flowers convolute around each other.

58. **Melica.** Glumes 5-nerved or more, scarious, obtuse. Panicle simple or nearly so.
59. **Diarrhena.** Glumes 3-nerved, coriaceous, the flowering one abruptly cuspidate. Panicle loosely few-flowered.

* * * * * * Flowering glume 5-nerved or more (sometimes obscurely so). Only the terminal flower abortive, or none.

+ Glumes more or less strongly compressed and carinate (ventricose in n. 63).

60. **Uniola.** Spikelets broad, flat and 2-edged, in usually loose panicles. Glumes coriaceous, acute, the 3–6 lower ones empty.
61. **Distichlis.** Diœcious. Spikelets large, flattened, in a close panicle. Empty glumes 2, acute.
62. **Dactylis.** Panicle contracted in 1-sided clusters. Glumes herbaceous, awn-pointed, rough-ciliate on the keel.
63. **Briza.** Spikelets heart-shaped, in lax panicles. Glumes roundish, ventricose, scarious-margined.
64. **Poa.** Spikelets small, flattened, ovate to lance-ovate, in a loose panicle. Flowering glumes membranous and scarious-margined, pointless, usually webby or pubescent toward the base.
65. **Graphephorum.** Spikelets compressed, in a loose panicle, the hairy jointed rhachis produced into a hairy pedicel. Glumes thin-membranous, faintly nerved, entire.

+ + Glumes convex on the back, not carinate (or somewhat so in n. 70).

66. **Scolochloa.** Spikelets subterete, in a lax panicle, the rhachis villous at the base of the flowers, ending in a naked pedicel. Glumes coriaceous, prominently 7-nerved, toothed at the apex. In water.
67. **Glyceria.** Spikelets terete or flattish. Flowering glumes scarious at the usually blunt summit, prominently 5–7-nerved.
68. **Puccinellia.** Mainly as Glyceria, but the glumes obsoletely 5-nerved.
69. **Festuca.** Spikelets terete or flattish. Flowering glume acute, pointed or awned at the tip, few-nerved. Styles terminal.
70. **Bromus.** Glume rounded or keeled on the back, mostly awned below the 2-cleft tip, 5–9-nerved. Styles scarcely terminal.

**Tribe X. HORDEÆ.** Spikelets 1–several-flowered, sessile on opposite sides of a zigzag jointed channelled rhachis, forming a spike. Empty glumes sometimes abortive or wanting. Uppermost flower imperfect or abortive.

* Spikelets single at each joint of the solitary spike.

71. **Lolium.** Spikelets many-flowered, placed edgewise on the rhachis of the spike, with one empty glume.
72. **Agropyrum.** Spikelets 3–several-flowered, placed flatwise on the rhachis. Empty glumes 2, right and left.
73. **Lepturus.** Spikelets small, 1–2-flowered; empty glumes 1 or 2. Spike very slender.

* * Spikelets 2 or more at each joint of the solitary spike; the empty glumes side by side in front of the spikelets (none or rudimentary in n. 76.)

74. **Hordeum.** Spikelets 1-flowered, 3 at each joint, the lateral ones usually sterile.

75. **Elymus.** Spikelets 1 - several-flowered, all perfect and similar.

76. **Asprella.** Spikelets few-flowered, somewhat pedicelled, 1 - 3 at each joint. Glumes none or small and deciduous.

**Tribe XI. BAMBUSEÆ.** Tall woody reeds, the flat leaves with a short petiole jointed upon the sheath. Spikelets few - many-flowered, flattened, in panicles or racemes.

77. **Arundinaria.** Flowering glumes rounded on the back, many-nerved, acuminate or bristle-pointed; empty glumes very small.

### 1. SPARTÌNA, Schreber. Cord or Marsh Grass. (Pl. 9.)

Spikelets 1-flowered, very much flattened laterally, jointed and sessile in 2 ranks on the outer side of a triangular rhachis. Glumes 3, unequal, lanceolate, strongly compressed-keeled, acute or bristle-pointed, mostly rough-bristly on the keel; palet thin, equalling or longer than the flowering glume. Stamens 3. Styles long, more or less united. — Perennials, with simple and rigid often reed-like culms, from extensively creeping scaly rootstocks, racemed spikes, very smooth sheaths, and long tough leaves (whence the name, from σπαρτίνη, *a cord*, such as was made from the bark of the *Spartium* or Broom).

* *Spikelets compactly imbricated very rough-hispid on the keels; spikes* (2 - 4′ *long*) *more or less peduncled; culm and elongated leaves rigid.*

1. **S. cynosuroìdes,** Willd. (Fresh-water Cord-Grass.) *Culm rather slender* (2 - 6° high) · *leaves narrow* (2 - 4° long, ½′ wide below or less), tapering to a very slender point, keeled, flat, but quickly involute in drying, smooth except the margins; *spikes* 5 - 20, scattered, spreading; rhachis rough on the margins; *glumes awn-pointed*, especially the middle one (its awn about ¼′ long), strongly serrulate-hispid on the keel, *the lower equalling the upper*, whose strong midrib abruptly terminates below the membranous apex. — Banks of rivers and lakes, or in rich soil, especially northward. Aug.

2. **S. polystàchya,** Willd. (Salt Reed-Grass.) *Culm tall and stout* (4 - 9° high. often 1′ in diameter near the base); *leaves broad* (½ - 1′), *roughish underneath*, as well as the margins; *spikes* 20 - 50, *forming a dense oblong raceme* (purplish); *glumes barely mucronate, the lower half the length of the flowering one*, of which the rough-hispid midrib reaches to the apex. — Salt or brackish marshes, within tide-water, especially southward.

3. **S. júncea, Willd.** (Rush Salt-Grass.) *Culms low* (1 - 2° high) *and slender; leaves narrow and rush-like, strongly involute, very smooth; spikes* 1 - 5, on very short peduncles, the rhachis smooth; *glumes acute*, the lower scarcely half the length of the middle one, not half the length of the upper. — Salt marshes and sea-beaches. Aug. (Eu.)

* * *Spikelets loosely imbricated, or somewhat remote and alternate, the keels only slightly hairy or roughish under a lens; spikes sessile and erect, soft; leaves, rhachis, etc., very smooth; culm rather succulent.*

4. **S. stricta,** Roth. (Salt Marsh-Grass.) (Pl. 9, fig. 1 - 3.) Culm 1 - 4° high, leafy to the top; leaves soon convolute, narrow; spikes few (2 - 4), the rhachis slightly projecting beyond the crowded or imbricated spikelets; glumes acute, very unequal, the larger 1-nerved, a little longer than the flower. — Salt marshes, Penn., etc. — Odor strong and rancid. (Eu.)

Var. **glàbra,** Gray. Culm and leaves longer; spikes 5 - 12 (2 - 3′ long); spikelets imbricate-crowded. — Common on the coast.

Var. **alterniflòra**, Gray. Spikes more slender (3 – 5′ long), and the spikelets remotish, barely overlapping, the rhachis continued into a more conspicuous bract-like appendage; larger glume indistinctly 5-nerved; otherwise as in the preceding form, into which it passes. — Common with the last; also Onondaga Lake, *J. A. Paine.*

### 2. BECKMÁNNIA, Host. (Pl. 15.)

Spikelets jointed upon the pedicels, 1 – 2-flowered (only one fertile), obovate and laterally compressed, imbricated in 2 rows upon one side of the angled rhachis of a spike. Glumes 3 or 4, the 2 lower strongly concave and carinate, obtuse or acutish, the 1 or 2 flowering glumes narrower, lanceolate, acute or acuminate and a little exserted, becoming rather rigid and with the thin palet enclosing the oblong grain. — A stout erect subaquatic perennial, with the short spikes erect and simply spicate or in a strict narrow panicle. (Named for *John Beckmann,* professor of botany at Goettingen.)

1. **B. erucæfórmis,** Host, var. **uniflòra,** Scribn. Glumes 3 and spikelets 1-flowered; spikes (6″ long or less) panicled. — N. W. Iowa, W. Minn., and westward. The Old World form, which also is found in the far northwest, has 2-flowered spikelets.

### 3. PÁSPALUM, L. (Pl. 13.)

Spikelets spiked or somewhat racemed, in 2 – 4 rows on one side of a flattened or filiform continuous rhachis, jointed upon very short pedicels, plano-convex, awnless, 1-flowered. Glumes 3 (rarely only 2), the terminal one flowering. Flower coriaceous, mostly orbicular or ovate, flat on the inner side, convex on the outer. Stamens 3. Spikes one or more, at or toward the summit of an elongated peduncle. (Πασπάλος, a Greek name for Millet.)

* *Spikes with a* (1″) *broad and thin membranaceous or foliaceous and keeled rhachis, the incurved margins partly enclosing the small two-rowed spikelets.* (*Smooth, aquatic, or nearly so, decumbent or floating.*)

1. **P. flùitans,** Kunth. Annual; *leaves lanceolate, flat* (3 – 8″), broad; *spikes numerous in a raceme,* the rhachis somewhat projecting beyond the minute and slightly pubescent spikelets into a tapering point, scabrous on the back. — River-swamps, Va. to S. Ill., Mo., and southward. Sept., Oct.

2. **P. Walteriànum,** Schultes. Perennial; *leaves linear, short; spikes* 3 – 7, the lowest partly included in the sheath of the uppermost leaf, the rhachis blunt; spikelets glabrous. — Low or wet grounds, N. J. (Cape May, *Nuttall*), Del., and southward.

* * *Spikes with a narrow wingless rhachis; perennials, or mostly so.*

+– *Spikelets very obtuse, orbicular; spikes one terminal and often* 1 – 5 *lateral.*

3. **P. setàceum,** Michx. Culm ascending or decumbent (1 – 2° long), slender; leaves (2″ wide, flat) and sheaths clothed with soft spreading hairs; *spikes very slender* (2 – 4′ long), smooth, *mostly solitary on a long peduncle, and usually one from the sheaths of each of the upper leaves on short peduncles or included; spikelets* (½″ wide) *narrowly 2-rowed.* — Sandy fields; common from E. Mass. to Ill., and southward. Aug.

4. **P. læve,** Michx. (Pl. 13, fig. 1 – 3.) Bright green, sparingly villous, rather stout; stems somewhat decumbent; leaves and spikes widely spread-

ing; spikes (2 – 4) approximate, 2 – 4′ long, smooth or nearly so; spikelets about 1″ wide, 2-rowed. — Moist soil, S. New Eng. to Ky., and southward.

5. **P. Floridànum,** Michx. Stout, erect, 3 – 6° high, glaucous; sheaths and leaves more or less villous, the latter and the spikes erect or ascending; spikes (2 – 5) broader, 2 – 5′ long, the smooth spikelets nearly 2″ broad, in 2 rows. — Moist soil; Del. to Fla., Ark., and Tex.

+– +– *Spikelets acute; spikes several, racemose.*

6. **P. dilatàtum,** Poir. Stout, erect, 2 – 5° high, villous at the top of the sheath; spikes few on a naked peduncle, erect, 2 – 3′ long; spikelets 1″ long or more, the lower glume soft-villous on the margin. — Va. to Tex.

+– +– +– *Spikelets acute; spikes always a pair at the summit of the naked peduncle.*

7. **P. dístichum,** L. (Joint-Grass.) Nearly glabrous, rather glaucous; culms ascending (about 1° high) from a long creeping base; leaves linear-lanceolate (2 – 3′ long); peduncle usually short; *spikes short* and closely-flowered (9″ – 2′ long), often slightly separated; rhachis flat on the back; *spikelets ovate, slightly pointed* (barely 1½″ long), *approximate on one side of the rhachis.* — Wet fields, Va. and southward. July – Sept.

8. **P. Ellióttii,** Watson. Culms ascending (1 – 2½° high) from a creeping base; leaves lanceolate (3 – 6′ long, 4 – 6″ wide); *spikes slender*, rather sparsely flowered (1 – 4′ long), *both sessile* upon the long slender peduncle; *spikelets ovate-lanceolate* (2″ long), *on nearly opposite sides of the rhachis.* (Milium paspalòdes, *Ell.* P. Digitaria, *Chapm.;* not *Poir.*) — Va. and southward.

## 4. ERIÓCHLOA, HBK. (Pl. 15.)

Spikelets ovate, subsessile or shortly pedicelled upon one side of the rhachis of a spike, with a callus at base and jointed on the pedicel, 1-flowered. Glumes 3, the 2 empty ones slightly unequal, membranaceous, acute, the flowering one shorter, indurated, obtuse, enclosing the free grain. — Coarse tufted grasses, with flat leaves, the spikes more or less scattered along a common peduncle, and the pedicels and rhachis of the spike usually pubescent or hairy (hence the name, from ἔριον, *wool*, and χλόα, *grass*).

1. **E. polystàchya,** HBK. Culms erect or decumbent, 2° high; spikes 6 – 12, erect or ascending, 1 – 2′ long, forming a compound spike 3 – 6′ long; spikelets glabrous, very shortly pedicelled, oblong-lanceolate, nearly 2″ long. — S. Kan. to Tex. and Mex.

## 5. PÁNICUM, L. Panic-Grass. (Pl. 13.)

Spikelets jointed upon the pedicels, ovate, panicled, racemed, or sometimes spiked, not involucrate, with one perfect and sometimes a second lower rudimentary or staminate flower. Glumes 4, but the lower one usually short or minute (rarely even wanting), and the third empty or sterile, membranaceo-herbaceous. Upper flower perfect, closed, coriaceous or cartilaginous, usually flattish parallel with the glumes, awnless (except in § 3), enclosing the free and grooveless grain. Stamens 3. Stigmas plumose, usually purple. (An ancient Latin name of the Italian Millet, P. Italicum (now Setaria Italica), of uncertain origin and meaning.)

§ 1. DIGITÀRIA. *Spikelets crowded* 2 – 3 *together in simple and mostly* 1-*sided clustered spikes or spike-like racemes, wholly awnless and pointless,* 1-*flowered; lower glume minute or obsolete or wanting; annual, often purplish.*

* *Spikes erect; the rhachis filiform and nearly terete.*

1. **P. filifórme,** L. Culms very slender (1 – 2° high), upright; lower sheaths hairy; spikes 2 – 8, alternate, approximate, filiform; spikelets oblong, acute (½″ long); lower glume almost wanting. — Dry sandy soil, Mass. to N. J. along the coast, to Iowa, Neb., and southward. Aug.

* * *Spikes spreading; the rhachis flat and thin.*

**P.** GLÀBRUM, Gaudin. Culms spreading, prostrate, or sometimes erect (5 – 12′ long), glabrous; *spikes* 2 – 6, *widely diverging,* nearly digitate; spikelets ovoid (about 1″ long); *upper empty glume equalling the flower, the lower almost wanting.* — Cultivated grounds and waste places; common, especially southward; sometimes appearing indigenous. Aug., Sept. (Nat. from Eu.)

**P.** SANGUINÀLE, L. (COMMON CRAB- OR FINGER-GRASS.) (Pl. 13, fig. 1 - 3.) Culms erect or spreading (1 – 2° high); leaves and sheaths glabrous or hairy; *spikes* 4 – 15, *spreading,* digitate; spikelets oblong (1½″ long); *second glume half the length of the flower, the lower one small.* — Cultivated and waste grounds. Aug. – Oct. (Nat. from Eu.)

§ 2. PANICUM proper. *Spikelets scattered, in panicles, awnless.*

* *Panicle elongated and racemose, wand-like or pyramidal; the numerous and usually pointed spikelets short-pedicelled, excepting* n. 3 *and* 4.

+ *Sterile flower none; lower glume short; spikelets* ½ – 1½″ *long; annuals except* n. 4; *leaves flat; sheaths flattened.*

++ *Glabrous and smooth throughout; spikelets appressed, short-pedicelled.*

2. **P. prolíferum,** Lam. Culms usually thickish and rather succulent, branched, geniculate and ascending from a procumbent base; sheaths flattened; ligule ciliate; panicles terminal and lateral, compound, pyramidal, the slender primary branches at length spreading; spikelets pale green, rarely purplish; lower glume broad, ⅓ to ¼ the length of the upper, which is little longer than the flowering one. — Marshy river-banks and shores, especially if brackish, but also in the interior, from Mass. to Iowa, and southward. Aug.

++ ++ *Hispid or hairy on the sheaths, at least the lower; spikelets mostly scattered on slender pedicels in an ample, loose, at length very effuse panicle; culms mostly branched from the base, erect or ascending* (10 – 20′ *high*).

3. **P. capillàre,** L. (OLD-WITCH GRASS.) (Pl. 13, fig. 4, 5.) All the sheaths and usually the leaves *copiously hairy or hispid;* panicle mostly very compound, the branches divaricate when old; spikelets from ovoid to narrowly oblong, pointed; *lower glume half the length of the upper empty one,* which is longer than the *elliptical obtuse perfect flower.* — Sandy soil and cultivated fields everywhere. Aug. – Oct. — Varies extremely in size and appearance, the culms erect and simple, or decumbent, geniculate and branched; in depauperate forms the spikelets only ¾″, in the larger forms 1½″ in length.

4. **P. autumnàle,** Bosc. Root perennial (?), lower sheaths and margins of the small narrow leaves more or less hairy, *otherwise glabrous,* except some *bristly hairs in the main axils of the very effuse capillary panicle,* its much elongated divisions sparingly branched, or even simple and terminated with solitary *spindle*-shaped spikelets; *lower glume minute; perfect flower lanceolate-*

*oblong and pointed*, nearly equalling the lance-oblong obtusish empty glumes. — Sand-hills, Ill. to Minn., Mo., and southward.

+ + *Sterile flower rudimentary* (*staminate in* n. 7), *its glume fully twice the length of the lower glume; spikelets small* (1 *or* 1½″ *long*); *root perennial.*

5. **P. ánceps,** Michx. *Culms flat, upright* (2–4° high); leaves rather broadly linear (1–2° long, 4–5″ wide), smooth; panicle contracted-pyramidal; *spikelets ovate-lanceolate, pointed*, a little curved; *second glume* 5–7-*nerved;* neutral flower one third longer than the perfect one. — Wet sandy soil, N. J. and Penn. to S. Ill., and southward. Aug. — Spikelets larger and branches of the panicle longer and narrower than in the next.

6. **P. agrostoìdes,** Muhl. *Culms flattened, upright* (2–4° high); leaves long, and with the sheaths smooth; panicles terminal and often lateral, pyramidal (4–8′ long); *spikelets* racemose, crowded and one-sided on the spreading branches, *ovate-oblong, acute* (purplish); *second glume* 5-*nerved*, longer than the neutral flower; perfect flower shorter, bearded at the apex. — Wet meadows and shores, E. Mass. to Minn., Neb., and common southward. Aug.

7. **P. Curtísii,** Chapm. Culms stout, 3–4° high, often rooting below; mostly glabrous; panicle slender, simple, spike-like (6–8′ long), the spikes appressed; spikelets lanceolate, acute; lower glume half the length of the 5-nerved second one. — Ponds, Del. to Fl. and Tex.

+ + + *Sterile flower staminate; lower glume more than half the length of the next; spikelets large* (2–2½″ *long*), *ovate, pointed, as are the glumes, etc.; perennials, glabrous, with tall or stout and rigid upright culms.*

8. **P. virgàtum,** L. (Pl. 13, fig. 8, 9.) Tall (3–5° high); *leaves very long, flat;* ligule silky-bearded; *branches of the compound loose and large panicle* (9′–2° long) *at length spreading or drooping;* spikelets scattered, usually purplish. — Moist sandy soil; common. Aug.

9. **P. amàrum,** Ell. Culms (1½° high or more) sheathed to the top; *leaves involute, glaucous, coriaceous, the uppermost exceeding the contracted panicle*, the simple racemose branches of which are appressed; spikelets pale. — Sandy shores, Conn., Va., and southward. Aug., Sept. — The northern form (var. MÌNUS, Vasey & Scribn.) somewhat smaller than the southern.

* * *Panicle short or small, loosely spreading or diffuse; perennials.*

+ *Sterile flower none; spikelets warty roughened.*

10. **P. verrucòsum,** Muhl. Smooth; culms branching and spreading, very slender (1–2° long), naked above; leaves linear-lanceolate (2–3″ wide), shining; branches of the diffuse panicle capillary, few-flowered; spikelets dark green, oval, acute, ¾″ long; lower glume ¼ as long as the faintly nerved second. — Sandy swamps, N. Eng. to Va., near the coast, and southward.

+ + *Lower* (*sterile*) *flower neutral, or in* n. 12 *and sometimes in* n. 11 *staminate, the palet scarious and sometimes small and inconspicuous.*

++ *Culm-leaves broadly lanceolate or wider, with* 9–15 *principal nerves* (*obscure or none in* n. 17).

= *Spikelets* 1–1½″ *long.*

11. **P. xanthophỳsum,** Gray. Culm simple, or at length branched near the base (9–15′ high); *sheaths hairy; leaves lanceolate, very acute* (4–6′

long by ½′ wide), *not dilated at the ciliate-bearded clasping base, smooth* except the margins, *strongly* 9–11-*nerved; panicle long-peduncled, very simple,* the appressed branches bearing a few *roundish-obovate spikelets* (about 1½″ long); lower glume ovate, acutish, ⅓–½ the length of the 9-nerved second.—Dry sandy soil, Maine to Penn., Wisc., Iowa, and northward; rare. June.—Yellowish-green; spikelets minutely downy; sterile flower sometimes staminate.

12. **P. latifòlium,** L. Culm (1–2° high) smooth; the joints and the throat or margins of the otherwise *smooth sheaths often bearded with soft woolly hairs; leaves broadly oblong-lanceolate from a heart-clasping base* (often 1′ wide), taper-pointed, 11–15-nerved, smooth, or sparingly downy-hairy; panicle more or less exserted (2–3′ long), usually long-peduncled, the branches spreading; *spikelets obovate,* 1½″ *long,* downy; lower glume ovate, not half the length of the many-nerved second; sterile flower often (not always) with 3 stamens.—Moist thickets; common. June–Aug.

13. **P. clandestìnum,** L. (Pl. 13, fig. 6, 7.) Culm rigid (1–3° high), very leafy to the top, at length producing appressed branches, the *joints naked; sheaths rough with papillæ bearing very stiff and spreading bristly hairs;* leaves oblong-lanceolate from a heart-clasping base, very taper-pointed; lateral and usually also the terminal *panicle more or less enclosed in the sheaths,* or with the terminal one at length long-peduncled;—otherwise resembling n. 12; but *the spikelets more ovoid,* often smooth; the lower flower (always?) neutral.—Low thickets and river-banks, N. Eng. to Mich., Mo., and southward. June–Sept.

14. **P. víscidum,** Ell. Culms stout, upright or ascending, at length much branched, leafy to the top, *densely velvety-downy all over,* as also the sheaths, with reflexed soft and often clammy hairs, except a ring below each joint; leaves likewise velvety, lanceolate (½′ wide), 11–13-nerved; panicle spreading, the lateral ones included; *spikelets obovate,* 1 or 1½″ *long,* downy; the roundish lower glume scarcely one fourth the length of the 7-nerved second one.—Damp soil, N. J. to Va., and southward. Aug.

15. **P. scopàrium,** Lam. *Culms* upright, at length much branched and reclining (1–2° long), *roughish; leaves lanceolate* (3–5′ long by ⅓–½′ wide), *rather faintly* 9-*nerved,* hairy or smooth, *fringed* on the whole margin or next the base *with long and stiff spreading hairs, the sheaths bristly throughout* with similar hairs; *panicle open, nearly simple, bearing few* tumid-obovate hairy or smoothish *spikelets about* 1½″ *long;* lower glume roundish, about half or a quarter of the length of the upper one. (P. pauciflorum, *Ell.*)—Wet meadows and copses, E. Mass. to Minn., west and southward. June, July.

16. **P. commutàtum,** Schultes. Rather slender, erect, 1–2° high, *nearly glabrous;* leaves lanceolate, acuminate (3–6′ long), the margins toward the base and the sheaths sparsely ciliate; panicle spreading, often short-peduncled; *spikelets* scattered, glabrous, *oblong, acutish,* little more than 1″ long; *lower glume ovate,* often acute.—N. Y. to Fla.—A frequent variety with smaller spikelets (not 1″ long) approaches the next, and has also been confused with P. dichotomum.—Ont. to Va. and southward.

= = *Spikelets less than* 1″ *long.*

17. **P. nítidum,** Michx. (Lam.?) Resembles the last; leaves rather thick and the principal nerves very obscure or none except at the base; pan-

icle broad, more slender; spikelets smaller (⅔″ long), broadly ovate and very obtuse; lower glume very obtuse. (P. sphærocarpon, *Ell.*) — N. Y. to Ga., and westward.

18. **P. microcárpon,** Muhl. Like the last; the broadly lanceolate leaves nearly similar, but usually longer (8′ long or less), distinctly nerved; panicle soon exserted on a slender peduncle, rather narrower, with numerous slender branches and very many-flowered (3 – 7′ long); spikelets about ½″ long, ovoid, smooth or smoothish; lower glume orbicular and very small. — Dry or moist thickets, Penn. to Mich., Neb., and southward. July – Sept.

++ ++ *Culm-leaves linear or sometimes narrowly lanceolate (basal often lanceolate); primary nerves often indistinct or none; spikelets small.*

19. **P. depauperàtum,** Muhl. Culms simple or branched from the base, forming close tufts (6 – 12′ high), terminated by a simple and few-flowered contracted panicle, often much overtopped by the narrowly linear and elongated (4 – 7′) upper leaves; spikelets ¾ – 1½″ long, oval-obovate, commonly pointed when young; lower glume ovate. — Varies, with the leaves involute, at least when dry (P. involutum, *Torr.*), and with the sheaths either beset with long hairs or nearly smooth; the panicle either partly included, or on a long and slender peduncle. — Dry woods and hills; rather common. June.

20. **P. consanguíneum,** Kunth. Culms slender, 1 – 2° high, often decumbent and rooting below; nearly glabrous or the sheaths and leaves somewhat pubescent or villous; panicle small, with rather few spreading few-flowered branches; *spikelets* 1 – 1½″ long, *oblong-obovate, acutish.* — Dry woods, Norfolk, Va., and south to Fl. and Tex.

21. **P. dichótomum,** L.! Culms (8′ – 2° high) at first mostly simple, bearing a more or less exserted spreading compound panicle (1 – 3′ long), and linear to linear-lanceolate flat leaves (those tufted at the root usually ovate-lanceolate and very short, thickish); but commonly branching later in the season, the branches often clustered, and bearing nearly simple and included small panicles; *spikelets* ½ – ⅔″ long, *elliptical, obtuse,* downy or smooth; lower glume roundish. — Common everywhere. Very variable both in habit and in the amount of villosity (depending upon the soil, exposure, season, etc.), so that it is difficult to specify any well defined varieties. The more conspicuous forms are (*a*) *commùne,* with simple culms erect or ascending, and leaves suberect, usually pale green — (*b*) *fasciculàtum,* with clustered leafy branches and short peduncles, a common autumnal state — and (*c*) *grácile,* the culms lax, very slender and elongated, with rather distant spreading leaves (usually bright green), and mostly long-pedunculate panicles.

22. **P. laxiflòrum,** Lam.! Closely resembling the last species, in its several forms; distinguished by the larger acutish spikelets (nearly or quite 1″ long). — Common.

§ 3. ECHINÓCHLOA. *Spikelets imbricated-spiked on the branches of the simple or compound raceme or panicle, usually rough with appressed stiff hairs; lower palet of the sterile flower awl-pointed or awned.*

**P. Crus-gálli,** L. (Barnyard-Grass.) Root annual; culms stout, branching from the base (1 – 4° high); leaves lanceolate (½′ wide or more), rough-margined, otherwise with the sheaths smooth; spikes alternate (1 – 3′ long), crowded in a dense panicle; glumes ovate, abruptly pointed, glume of the neutral flower bearing a rough awn of variable length. — Varies greatly; sometimes awnless or nearly so; sometimes *long-awned*, especially in the var. híspidum, a very large and coarse form with the sheaths of the leaves very bristly. — Moist, chiefly manured soil; the variety in ditches, especially of brackish water; possibly indigenous. Aug. - Oct. (Nat. from Eu.)

### 6. SETÀRIA, Beauv. Bristly Foxtail Grass. (Pl. 13.)

Spikelets altogether as in Panicum proper, and awnless, but with the short peduncles bearing below the joint of the spikelet solitary or clustered bristles resembling awns (but not forming an involucre). Inflorescence a dense spiked panicle, or apparently a cylindrical spike. — Annuals, in cultivated or manured grounds, with linear or lanceolate flat leaves. (Name from *seta*, a bristle.)

* *Bristles single or in pairs, roughened or barbed downward.*

**S.** verticillàta, Beauv. Spike cylindrical (2 - 3′ long, pale green), composed of apparently whorled short clusters; bristles short, adhesive. — Near dwellings. (Adv. from Eu.)

* * *Bristles in clusters, roughened or barbed upward.*

**S.** glaùca, Beauv. (Foxtail. Pigeon-Grass.) (Pl. 13, fig. 1, 2.) *Spike cylindrical, dense, tawny yellow* (2 - 4′ long); *bristles* 6 - 11 *in a cluster*, much longer than the spikelets; *perfect flower transversely wrinkled.* — Very common, in stubble, etc. (Adv. from Eu.)

**S.** víridis, Beauv. (Green Foxtail. Bottle-Grass.) *Spike nearly cylindrical, more or less compound, green; bristles few*, longer than the spikelets; *flower striate lengthwise and dotted.* — Cultivated grounds. (Adv. from Eu.)

**S.** Itálica, Kunth. *Spike compound*, interrupted at base, thick, *nodding* (6 - 9′ long), *yellowish or purplish; bristles* 2 *or* 3 *in a cluster*, either much longer or else shorter than the spikelets. — Cultivated under the name of Millet, or Hungarian or Bengal Grass; rarely spontaneous. (Adv. from Eu.)

### 7. CÉNCHRUS, L. Hedgehog- or Bur-Grass. (Pl. 14.)

Spikelets as in Panicum, awnless, but enclosed 1 to 5 together in a globular and bristly or spiny involucre, which becomes coriaceous and forms a deciduous hard and rigid bur; the involucres sessile in a terminal spike. Styles united below. (An ancient Greek name of Setaria Italica.)

1. **C. tribuloìdes**, L. Annual; culms branched and ascending (1° high or less); leaves flat; spike oblong, of 8 - 20 spherical heads; involucre prickly all over with spreading and barbed short spines, more or less downy, enclosing 2 or 3 spikelets. — Sandy soil, on river banks, etc. Aug. — A vile weed.

### 8. AMPHICÁRPUM, Kunth. (Pl. 13.)

Spikelets jointed upon the pedicels, 1-flowered, oblong or ovoid, of two kinds; one kind in a terminal panicle, deciduous from the joint without fruit, although the flower is perfect; the other kind solitary at the extremity of slender runner-like radical peduncles (more or less sheathed toward the base), much larger than the others, perfect and fertile, subterranean, fertilized in the bud. Glumes 3, nearly equal, 5-nerved in the panicle, many nerved in the fertile spikelets; palet a little shorter; all becoming indurated and enclosing the very large grain. Stamens 3 (small in the radical flowers). Stigmas plumose, deep purple. (Name from ἀμφίκαρπος, *doubly fruit-bearing.*)

1. **A. Púrshii**, Kunth. Annual or biennial (?), erect, 1 - 4° high; leaves lanceolate, copious on the lower part of the culm, hispid, especially on the

sheaths; panicle strict, naked; grain ovoid or oblong (2–3″ long), terete.—Moist sandy pine-barrens, N. J. to Fla. Sept.

### 9. LEÉRSIA, Swartz. WHITE GRASS. (Pl. 7.)

Flowers crowded in one-sided panicled spikes or racemes, perfect, but those in the open panicles usually sterile by the abortion of the ovary, those enclosed in the sheaths of the leaves close-fertilized in the bud and prolific. Spikelets 1-flowered, flat, more or less imbricated over each other, jointed upon the short pedicels. Glumes 2, chartaceous, strongly flattened laterally or conduplicate, awnless, bristly-ciliate on the keels, closed, nearly equal in length, but the lower much broader, enclosing the flat grain. Palet none. Stamens 1–6. Stigmas feathery, the hairs branching.—Perennial marsh grasses; the flat leaves, sheaths, etc., rough upward, being clothed with very minute hooked prickles. (Named after *John Daniel Leers*, a German botanist.)

* *Spikelets narrowly oblong, rather loosely crowded.*

1. **L. Virgínica,** Willd. (WHITE GRASS.) *Panicle simple; the spikelets closely appressed* on the slender branches, around which they are partly curved (1½″ long); stamens 2 (a third imperfect or wanting); glumes sparingly ciliate (greenish-white).—Wet woods; Maine to Minn., and southward. Aug.

2. **L. oryzoìdes,** Swartz. (RICE CUT-GRASS.) (Pl. 7, fig. 1–3.) *Panicle diffusely branched; spikelets flat, rather spreading* (2½–3″ long); *stamens* 3; glumes strongly bristly-ciliate (whitish).—Very wet places; Mass. to Minn., and southward; common. Aug. (Eu.)

* * *Spikelets broadly oval, imbricately covering each other* (2½–3″ *long*).

3. **L. lenticulàris,** Michx. (CATCH-FLY GRASS.) Smoothish; panicle simple; glumes very flat, strongly bristly-ciliate (said to close and catch flies); stamens 2; otherwise like the preceding.—Low grounds, Va., Ill., and southward.

### 10. ZIZÀNIA, Gronov. WATER OR INDIAN RICE. (Pl. 7.)

Flowers monœcious; the staminate and pistillate both in 1-flowered spikelets in the same panicle. Glumes 2, subtended by a small cartilaginous ring, herbaceo-membranaceous, convex, awnless in the sterile, the lower one tipped with a straight awn in the fertile spikelets. Palet none. Stamens 6. Stigmas pencil-form.—Large, often reed-like water-grasses. Spikelets jointed upon the club-shaped pedicels, very deciduous. (Adopted from ζιζάνιον, the ancient name of some wild grain.)

1. **Z. aquática,** L. (INDIAN RICE. WATER OATS.) (Pl. 7, fig. 1–4.) Annual; culms 3–9° high; leaves flat, 2–3° long, linear-lanceolate; *lower branches of the* ample pyramidal *panicle staminate, spreading; the upper erect, pistillate; lower glume long-awned,* rough; styles distinct; grain linear, slender, 6″ long.—Swampy borders of streams and in shallow water; common, especially northwestward. Aug.

2. **Z. miliàcea,** Michx. Perennial; panicle diffuse, ample, the *staminate and pistillate flowers intermixed; awns short;* styles united; grain ovate.—Penn. (?), Ohio, and southward. Aug.—Leaves involute.

### 11. TRÍPSACUM, L. GAMA-GRASS. SESAME-GRASS. (Pl. 14.)

Spikelets monœcious, in jointed unilateral spikes, staminate above and fertile below. Staminate spikelets in pairs, sessile at each triangular joint of the narrow rhachis, both alike, 2-flowered, longer than the joints; glumes 4, coriaceous, the lower (outer) one nerved, the second boat-shaped, the upper with the palets very thin and membranaceous, awnless; anthers opening by 2 pores at the apex. Pistillate spikelets 2-flowered (the lower flower neutral), single and deeply imbedded in each oblong joint of the cartilaginous thickened rhachis, occupying a boat-shaped recess which is closed by the polished and cartilaginous ovate outer glume, the inner glume much thinner and pointed, the upper with the palets very thin and scarious, pointless. Styles united; stigmas very long (purple), hispid. Grain ovoid, free. — Culms stout and tall, solid, from very thick creeping rootstocks. Leaves broad and flat. Spikes axillary and terminal, separating spontaneously into joints at maturity. (Name from *τρίβω*, *to rub*, perhaps in allusion to the polished fertile spike.)

1. **T. dactyloìdes,** L. Spikes (4–8′ long) 2–3 together at the summit (when their contiguous sides are more or less flattened), and also solitary from some of the upper sheaths (when the fertile part is cylindrical); in var. MONOSTÀCHYUM, the terminal spike also solitary. — Moist soil, from Conn. to Penn. and Fla., near the coast, and from Ill. southward. Aug. — Culm 4–7° high; leaves like those of Indian Corn. This is one of our largest and most remarkable Grasses; sometimes used for fodder at the South.

### 12. ROTTBŒ́LLIA, L. f. (Pl. 15.)

Spikelets in pairs at each joint of a terete slender spike, awnless; one imperfect or rudimentary on a short and thick appressed pedicel; the other sessile and imbedded in an excavation of the joint of the rhachis, 1-flowered or rarely with a second staminate flower. Glumes 4, obtuse, the outer hard and cartilaginous, with a transverse depression next the base, the inner one boat-shaped and membranaceous, the 2 upper thin and delicate. Stamens 3. Styles 2. — Tall or coarse perennials, with rigid stems, and single cartilaginous spikes terminating the stem and axillary branches, chiefly subtropical. (Named for *Prof. C. F. Rottboell*, an excellent Danish botanist, who wrote much upon Gramineæ, Cyperaceæ, etc.)

1. **R. rugòsa,** Nutt. Culm flattish, 2–4° high; leaves linear; spikes 1–2′ long, the lateral ones on short clustered branches in the axils, often partly included in the sheaths of the leaves; sterile flower neutral; lower glume transversely rugose. — Low pine-barrens, from S. Del. (*W. M. Canby*) southward near the coast. Sept.–Oct.

### 13. ERIÁNTHUS, Michx. WOOLLY BEARD-GRASS. (Pl. 14.)

Spikelets spiked, in pairs upon each joint of the slender rhachis, one sessile, the other pedicelled, both 1-flowered, alike. Glumes 4, the 2 lower nearly equal, one 4–5-nerved, the other many-nerved; the 2 upper hyaline, one empty, the upper awned from the tip. Stamens 3. Grain free. — Tall and stout reed-like perennials, with the spikes crowded in a panicle, and clothed with long silky hairs, especially in a tuft around the base of each spikelet (whence the name, from *ἔριον*, *wool*, and *ἄνθος*, *flower*).

1. **E. saccharoides,** Michx. (Pl. 14, fig. 1, 2.) Culm (4–6° high) woolly-bearded at the joints; *panicle contracted; the silky hairs longer than the spikelets,* shorter than the awn; stamens 2. (E. alopecuroides, *Ell.*) — Wet pine-barrens, from N. J. and Ill. southward; rare. Sept., Oct.

2. **E. brevibárbis,** Michx. Culm (2–5° high), somewhat bearded at the upper joints; *panicle rather open;* silky hairs shorter than the spikelets. — Low grounds, Va., and southward.

### 14. ANDROPÒGON, Royen. BEARD-GRASS. (Pl. 14.)

Spikelets in pairs upon each joint of the slender rhachis, spiked or racemed, one of them pedicelled and sterile (staminate, pistillate or neutral), often a mere vestige, the other sessile, 1-flowered and fertile; lower glume the larger, coriaceous and nerved, blunt, the second carinate and acute, the 2 upper hyaline, the flowering glume awned from the tip. Stamens 1–3. Grain free. — Coarse, mostly rigid perennials, mostly in sterile or sandy soil; with lateral or terminal spikes commonly clustered or digitate; the rhachis hairy or plumose-bearded, and often the sterile or staminate flowers also (whence the name, composed of ἀνήρ, *man,* and πώγων, *beard*).

* *Spikes digitate, thickish, short-bearded, the sterile spikelet staminate; stamens* 3.

1. **A. furcàtus,** Muhl. (Pl. 14, fig. 1–3.) Tall, 3–4° high, rigid, the naked summit of the culm (and usually some lateral branches) terminated by 2–5 rigid spikes; spikelets approximate, appressed; hairs at the base of the fertile spikelet, on the rhachis and on the stout pedicel of the awnless staminate spikelet short and rather sparse; awn of fertile flower long and bent; leaves flat, roughish, the lower ones long. ("A. provincialis, *Lam.*") — Common in dry sterile soil. Aug.–Oct.

* * *Spikes with slender often zigzag rhachis, silky-villous,*

+– *Single and scattered along the branches, with the silky hairs shorter than the flowers; sterile spikelet conspicuous but mostly neutral; the fertile triandrous.*

2. **A. scopàrius,** Michx. Culms slender (1–3° high), with numerous paniculate branches; lower sheaths and narrow leaves hairy; spikes slender, scattered, mostly peduncled (1–2′ long), very loose, often purplish, silky with lax dull-white hairs; sterile spikelet awn-pointed or awnless; the fertile about half the length of its twisted or bent awn. — Dry ground. July–Sept.

3. **A. marítimus,** Chapm. Smooth and glaucous; culms ascending from creeping rootstocks, 1–1½° high; leaves rather rigid, divaricate, their compressed sheaths imbricated; panicle short; peduncles included within the conspicuous bracts; rhachis and pedicels copiously ciliate with spreading hairs; glumes larger, 3–4″ long. — Sandy sea-coast; Cape May, and south to Fla.

+– +– *In pairs or clustered; the copious soft-silky hairs much longer than the flowers; sterile spikelet a small neutral rudiment (in* n. 4 *and* 5), *or altogether wanting on the very plumose-hairy pedicel; fertile flower monandrous, its awn capillary; leaves narrow, the lower or their sheaths often rather hairy.*

4. **A. argénteus,** Ell. Smooth; culms rather slender (1–3° high); *spikes* in pairs (rarely in fours) on short mostly exserted *and loosely panicu-*

*late peduncles, densely flowered* (1 – 2′ long), *very silky with long bright white hairs.* (A. argyræus, *Schultes.*) — Md. to Va., near the coast, and southward.

5. **A. Elliòttii,** Chapm. Closely resembling the last; sheaths and leaves villous; upper nodes of the branches densely bearded. — Md. to Fla. and Tex.

6. **A. Virgínicus,** L. Culm flattish below, slender (2 – 3° high), *sparingly short-branched above,* sheaths smooth; *spikes 2 or 3 together in distant appressed clusters, shorter than their sheathing bracts,* weak (1′ long), the spikelets loose on the filiform rhachis, the soft *hairs dull white.* (A. dissitiflorus, *Michx.* A. vaginàtus, *Ell.*, a form with larger and inflated sheaths.) — Sandy soil, E. Mass. to Va., Ill., and southward. Sept., Oct.

7. **A. macroùrus,** Michx. Culm stout (2 – 3° high), *bushy-branched at the summit,* loaded with very numerous *spikes forming thick leafy clusters;* sheaths rough, the uppermost hairy; flowers nearly as in the preceding; the sterile spikelet of each pair wholly wanting, its pedicel slender and very plumose. — Low and sandy grounds, N. Y. to Va., near the coast, and southward.

8. **A. laguroìdes,** DC. Culms slender, tall, the elongated peduncle bearing numerous sessile spikes in a spike-like panicle 2 – 4′ long; spikes slender, 1′ long or more, very silky; spikelets glabrous, the sterile a narrow convolute empty glume. — Central Kan. to Tex. and Mex.

+– +– +– *Spikes digitate-clustered, very silky; sterile spikelet larger than the fertile one.*

9. **A. Hàllii,** Hackel. Culm stout, 2 – 3° high; lateral peduncles few, scarcely exserted from the sheaths; spikes 2 – 5, 1 – 3′ long, dense; spikelets 3 – 4″ long. — Central Kan. to Dak., and westward.

## 15. CHRYSOPÒGON, Trin. (Pl. 14.)

Spikelets in pairs on the ramifications of an open panicle (those at the ends of the branches in threes), the lateral ones pedicellate, sterile or often reduced merely to their pedicels; only the sessile middle or terminal one fertile, its glumes coriaceous or indurated, sometimes awnless; otherwise nearly as in Andropogon. Stamens 3. (Name composed of χρυσός, *gold*, and πώγων, *beard.*)

1. **C. nùtans,** Benth. (Indian Grass. Wood-Grass.) Root perennial; culm simple (3 – 5° high), terete; leaves linear-lanceolate, glaucous; sheaths smooth; panicle narrowly oblong, crowded or loose (6 – 12′ long); the perfect spikelets at length drooping (yellowish or russet-brown and shining), clothed especially toward the base with fawn-colored hairs, lanceolate, shorter than the twisted awn; sterile spikelets small and imperfect, deciduous, or reduced to a mere plumose-hairy pedicel. (Andropogon avenaceus, *Michx.* Sorghum nutans, *Gray.*) — Dry soil; common, especially southward.

## 16. PHÁLARIS, L. Canary-Grass. (Pl. 13.)

Spikelets crowded in a clustered or spiked panicle, 1-flowered. Glumes 5, the third and fourth reduced to mere rudiments (a scale or a pedicel), one on each side, at the base of the flowering glume and palet, which are flattish, awnless and shining, shorter than the equal boat-shaped and keeled persistent empty glumes, finally coriaceous or cartilaginous, and closely enclosing the flattened free and smooth grain. Stamens 3. — Leaves broad, mostly flat. (The ancient name, from φαλός, *shining,* alluding to the shining seed.)

§ 1. PHALARIS proper. *Panicle very dense, spike-like; glumes wing-keeled.*

**P. Canariénsis**, L. (Canary-Grass.) Annual, 1–2° high; spike oval; empty glumes white with green veins, the rudimentary ones small lanceolate scales. — Waste places and roadsides; rare. (Adv. from Eu.)

§ 2. DÍGRAPHIS. *Panicle branched, the clusters open in anthesis; glumes not winged on the back.*

1. **P. arundinàcea**, L. (Reed C.) (Pl. 13, fig. 1, 2.) Perennial, 2–4° high; leaves flat (3–5″ wide); glumes open at flowering, 3-nerved, thrice the length of the fertile flower; rudimentary glumes reduced to a minute hairy scale or pedicel. — Wet grounds; common, especially northward. June, July. — Var. pícta, the leaves striped with white, is the familiar Ribbon-Grass of the gardens. (Eu.)

## 17. ANTHOXÁNTHUM, L. Sweet Vernal-Grass. (Pl. 13.)

Spikelets spiked-panicled, 1-flowered. Glumes 5, the third and fourth empty, hairy, 2-lobed and awned on the back, the flowering glume and palet small, hyaline and obtuse; basal glumes persistent, very thin, acute, keeled, the lower half as long as the upper. Squamulæ none. Stamens 2. Grain ovate, adherent. (Name compounded of *ἄνθος*, *flower*, and *ἄνθων*, *of flowers.* *L.*)

**A. odoràtum**, L. Spikelets (brownish or tinged with green) spreading at flowering-time; one middle glume bearing a bent awn from near its base, the other short-awned below the tip. — Meadows, pastures, etc. Low slender perennial; very sweet scented in drying. May–July. (Nat. from Eu.)

## 18. HIERÓCHLOE, Gmelin. Holy Grass. (Pl. 13.)

Spikelets 3-flowered, open-panicled, the two lower (lateral) flowers staminate only, 3-androus, sessile, the carinate glumes often awned on the middle of the back or near the tip, the uppermost flower perfect, short-pedicelled, scarcely as long as the others, 2-androus, awnless. Basal glumes persistent, carinate, acute, somewhat 3-nerved, equalling or exceeding the spikelet. — Perennials; leaves flat. (Name composed of *ἱερός*, *sacred*, and *χλόη*, *grass*; these sweet-scented grasses being strewn before the church-doors on saints' days, in the North of Europe.)

1. **H. boreàlis**, Roem. & Schultes. (Vanilla or Seneca Grass.) (Pl. 13, fig. 1, 2.) Panicle somewhat one-sided, pyramidal (2–5′ long); peduncles smooth; staminate flowers with the glume mucronate or bristle-pointed at or near the tip; rootstock creeping. — Moist meadows, chiefly northward near the coast and along the Great Lakes. May. — Culm 1–2° high, with short, lanceolate leaves. Spikelets chestnut-color; the staminate flowers strongly hairy-fringed on the margins, and the fertile one at the tip. (Eu.)

2. **H. alpina**, Roem. & Schultes. Panicle contracted (1–2′ long); one of the staminate flowers with its glume barely pointed or short-awned near the tip, the other long-awned from below the middle; lowest leaves very narrow. — Alpine mountain-tops, N. Eng., N. Y., and northward. July. (Eu.)

## 19. ARÍSTIDA, L. Triple-awned Grass. (Pl. 8.)

Spikelets 1-flowered, not jointed on the pedicels. Outer glumes unequal, often bristle-pointed; the flowering glume tipped with three awns; the palet much smaller. Otherwise much as in Stipa. — Culms branching; leaves narrow, often involute. Spikelets in simple or panicled racemes or spikes. Grain linear. All grow in sterile, dry soil, and all ours have the awns naked and persistent, and flower late. (Name from *arista*, a beard or awn.)

* *Awns separate to the base, not jointed with the glume.*

+- *Awns very unequal; the much shorter or minute lateral ones erect, the elongated middle one horizontal or turned downward; low* (5 – 18′ *high*) *and branching, mostly tufted annuals, and the spikelets in nearly simple spikes.*

++ *Middle awn more or less coiled.*

1. **A. ramosíssima,** Engelm. Culms much branched; spikes loose, usually exserted; lower glumes 6 – 10″ long, exceeding the upper, usually rather strongly 3 – 5-nerved; middle awn 1′ long, soon abruptly hooked-recurved, the lateral ones 1 – 3″ long. — Dry prairies of Ill., Ky., and Mo. — Also var. UNIARISTÀTA, Engelm., with the lateral awns wanting.

2. **A. basiràmea,** Engelm. Spikes closer, mostly enclosed at base, at all the lower nodes (even to the base of the culm) very short and sessile; lower glumes 4 – 8″ long, mostly thin and 1-nerved or rather faintly 3-nerved; middle awn very slender, 6″ long, the lateral 2″ long. — Ill. to Neb. and Minn.

3. **A. dichótoma,** Michx. (POVERTY GRASS.) Culms low, very slender, much branched throughout, ascending; spikelets in narrow strict simple or compound spikes; lower glumes nearly equal (3 – 4″ long), longer than the flowering glume and fully equalling its minute lateral awns (or unequal and shorter, in var. CURTÍSSII, Gray), the soon reflexed middle awn about as long. — Dry, sandy or gravelly fields; common, Maine to Ill., and southward.

++ ++ *Middle awn nearly straight* (*not coiled*).

4. **A. grácilis,** Ell. Culms slender, erect (6 – 18′ high), naked above and terminating in a slender raceme- or spike-like virgate panicle; lower glumes 1-nerved, about the length of the upper, the exserted lateral awns varying from one third to fully half the length of the horizontally bent middle one; or in var. DEPAUPERÀTA, from one fifth to one third its length. — Sandy soil, coast of Mass., and from Ill. southward. — Middle awn 3 – 9″ long in the ordinary forms, but not rarely shorter, and very variable often on the same plant.

+- +- *Awns all diverging and alike, or the lateral ones moderately shorter, rarely at all coiled.*

++ *Glumes equal or the middle one longer.*

5. **A. stricta,** Michx. Culms (2 – 3° high) densely tufted from a *perennial* root, bearing a (1°) long *spiked panicle;* leaves involute-thread-form, long, rigid, sometimes downy; awns about the length of the glumes (6″) or the lateral one third shorter. — Va. and southward.

6. **A. oligántha,** Michx. Culms (6 – 20′ high) tufted from an *annual* root, bearing a *loosely few-flowered raceme;* leaves short, somewhat involute when dry; lower glume 3 – 5-nerved (nearly 1′ long); *awns capillary,* 1½ – 3′ long, much exceeding the slender spikelet. — Va. to Ill., and common southwestward.

7. **A. purpùrea,** Nutt. Perennial; culms (1° high or less) densely tufted, spreading; leaves revolute and filiform, short; panicle loose, of rather few slender-pedicellate spikelets; lower glumes thin, 1-nerved, loose, the outer

about half the length of the inner, which is 8 – 10″ long; awns 2 – 4″ long — Minn. and Dak. to Tex. — Very variable.

++ ++ *Middle glume shorter than the lower; perennials, simple-stemmed, 2 – 4° high.*

8. **A. purpuráscens,** Poir. (Pl. 8.) *Glabrous;* leaves long, rather involute; spikelets in a (10 – 18′) long spiked panicle; lower glumes 1-nerved; *awns much longer than the spikelet,* the middle one about 1′ long. — Mass. to Mich., Minn., and southward; common.

9. **A. lanàta,** Poir. Tall and stout; *leaves* tardily involute, *rough* above, rigid; *sheaths woolly;* panicle (1 – 2° long) spike-like or more compound and open; glumes 1-nerved, 6 – 8″ long; middle awn 1′ long. — Del. to Fla.

* * *Awns united below into one, jointed with the apex of the glume; root annual.*

10. **A. tuberculòsa,** Nutt. Culm branched below (6 – 18′ high), tumid at the joints; panicles rigid, loose, the branches in pairs, one of them short and about 2-flowered, the other elongated and several-flowered; lower glumes (1′ long, including their slender-awned tips) longer than the upper, which is tipped with the common stalk (about its own length) of the 3 equal divergently-bent awns (1½ – 2′ long) twisting together at the base. — Sandy soil, E. Mass. to N. J.; also Wisc., Minn., and southward.

## 20. STÌPA, L. Feather-Grass. (Pl. 8.)

Spikelets 1-flowered, terete; the flower falling away at maturity (with the conspicuous obconical bearded and often sharp-pointed callus) from the membranaceous persistent lower glumes. Fertile glumes coriaceous, cylindrical-involute and closely embracing the smaller palet and the cylindrical grain, having a long and twisted or tortuous simple awn jointed with its apex. Stamens mostly 3. Stigmas plumose. — Perennials, with narrow involute leaves and a loose panicle. (Name from στύπη, *tow*, in allusion to the flaxen appearance of the feathery awns of the original species. In our species the awn is naked.)

* *Callus or base of the flower short and blunt; lower glumes pointless.*

1. **S. Richardsònii,** Link. Culm (1½ – 2° high) and leaves slender; panicle loose (4 – 5′ long), with slender few-flowered branches; lower glumes nearly equal, oblong, acutish (2½ – 4″ long), about equalling the pubescent linear-oblong fertile one, which bears a tortuous awn 6 – 9″ long. — Pleasant Mountain, near Sebago Lake, Maine, Mt. Marcy, N. Y., north shore of L. Superior, Mont., and northward.

* * *Callus pungently pointed, at maturity villous-bearded; flowering glume slender and minutely bearded at the tip; empty glumes taper-pointed.*

2. **S. avenàcea,** L. (Black Oat-Grass.) (Pl. 8.) Culm slender (1 – 2° high); leaves almost bristle-form; *panicle open; fertile glume blackish, nearly as long as the lower ones* (about 4″ long); the awn bent above, twisted below (2 – 3′ long). — Dry woods, S. New Eng. to Wisc., and southward.

3. **S. spártea,** Trin. (Porcupine Grass.) Culm rather stout (1½ – 3° high); *panicle contracted; fertile glume linear,* ¾ – 1′ long (including the long callus), pubescent below, *shorter than the* lanceolate slender subulate-pointed

greenish *lower glumes;* the twisted strong awn (3½ – 7′ long), pubescent below, rough above. — Plains and prairies, from Ill. and N. Mich. northwestward.

4. **S. virídula,** Trin. Culms clustered, 1 – 3° high or more; panicle narrow and usually dense, 6 – 18′ long; glumes very thin, 3 – 4″ long; fertile glume usually somewhat silky, with a short callus; awn 1′ long, slender, glabrous or a little pubescent below. — W. Minn., Dak., and southwestward.

## 21. ORYZÓPSIS, Michx. MOUNTAIN RICE. (Pl. 8.)

Spikelets 1-flowered, nearly terete. Lower glumes herbaceous or thin-membranaceous, several-nerved, nearly equal, commonly rather longer than the oblong flower, which is deciduous at maturity, and with a very short obtuse callus or scar-like base. Flowering glume coriaceous, at length involute so as closely to enclose the equal palet and the oblong grain; a simple untwisted and deciduous awn jointed on its apex. Stamens 3. Squamulæ 2 or 3, conspicuous. Stigmas plumose. — Perennials, with rigid leaves and a narrow raceme or panicle. Spikelets greenish, rather large. (Name composed of *ὄρυζα, rice,* and *ὄψις, likeness,* from a fancied resemblance to that grain.)

* *Styles distinct, short; culm leafy to the summit; leaves broad and flat.*

1. **O. melanocárpa,** Muhl. Leaves lanceolate, taper-pointed; sheaths bearded in the throat; panicle simple or sparingly branched; awn thrice the length of the blackish glume (nearly 1′ long). — Rocky woods, N. Eng. to Penn., Minn., Mo., and westward. Aug. — Culm 2 – 3° high.

* * *Styles united below, slender; culms tufted, naked; leaves concave or involute.*

2. **O. asperifòlia,** Michx. (Pl. 8, fig. 1, 2.) Culms (9 – 18′ high), with sheaths bearing a mere rudimentary blade, overtopped by the *long and rigid linear leaf from the base;* very simple panicle or raceme few-flowered; *awn 2 – 3 times the length of the rather hairy whitish glume.* — Hillsides, etc., in rich woods; common, N. Eng. to Minn., and northward. May. — Leaves without keels, rough-edged, pale beneath, lasting through the winter. Squamulæ lanceolate, almost as long as the palet!

3. **O. Canadénsis,** Torr. Culms slender (6 – 15′ high), the lowest sheaths leaf-bearing; *leaves involute-thread-shaped;* panicle contracted (1 – 2′ long), the branches usually in pairs; glume pubescent, whitish; *awn short and very deciduous, or wanting.* — Rocky hills and dry plains, Maine to W. New Eng., the mountains of Penn., Wisc., Minn., and northward; rare. May. — Glumes 1 – 2″ long, sometimes purplish.

## 22. MÍLIUM, Tourn. MILLET-GRASS. (Pl. 13.)

Spikelets 1-flowered, diffusely panicled, not jointed with their pedicels, consisting of 2 equal membranaceous convex and awnless persistent glumes, with a coriaceous awnless flowering glume and narrow palet. Stamens 3. Stigmas branched-plumose. Grain not grooved, enclosed in its glume and palet, all deciduous together. (The ancient Latin name of the Millet, which however belongs to a different genus, of uncertain meaning.)

1. **M. effùsum,** L. Smooth perennial, 3 – 6° high; leaves broad and flat, thin; panicle spreading (6 – 9′ long); flower ovoid-oblong. — Cold damp woods and mountain meadows, N. Eng. to Ill., and northward. June. (Eu.)

### 23. MUHLENBÉRGIA, Schreber. DROP-SEED G. (Pl. 8.)

Spikelets 1-flowered, in contracted or rarely in open panicles. Empty glumes mostly acute or bristle-pointed, persistent, usually thin; the lower rather smaller or minute. Flower very short-stalked or sessile, the glume and palet usually minutely bearded at base, herbaceous, deciduous with the enclosed grain, often equal, the glume 3-nerved, mucronate or awned at the apex. Stamens 3. (Dedicated to the *Rev. Dr. Henry Muhlenberg*, a distinguished American botanist of the early part of this century.)

§ 1. MUHLENBERGIA proper. *Panicles contracted or glomerate, on branching rigid culms from scaly creeping rootstocks; leaves short and narrow.*

* *Flowering glume barely mucronate or sharp-pointed.*

1. **M. sobolífera,** Trin. Culms ascending (1 – 2° high), rarely branching; the *simple contracted panicle very slender* or filiform; lower *glumes barely pointed, almost equal, one third shorter than the flower;* flowering glume abruptly short-mucronate, equalling the palet. — Open rocky woods, Mass. to Mich., Minn., and southward. Aug. — Spikelets less than 1″ long.

2. **M. glomeràta,** Trin. Culms upright (1 – 3° high), sparingly branched or simple; *panicle* (2 – 3′ long) *oblong-linear, contracted into an interrupted glomerate spike,* long-peduncled, the branches sessile; *glumes awned,* nearly equal, and (with the bristle-like awn) about twice the length of the unequal very acute flowering glume and palet. — Bogs and wet rocks, common, especially northward. Aug. — Var. RAMÒSA, Vasey. A stout strict much-branched leafy form, the lower glumes but little longer than the flower. Ill. to Dak.

3. **M. Mexicàna,** Trin. Culms ascending, much branched (2 – 3° high); *panicles* lateral and terminal, often included at the base, *contracted, the branches densely spiked-clustered,* linear (green and purplish); lower *glumes awnless, sharp-pointed,* unequal, the upper about the length of the very acute flowering one. — Low grounds; common. Aug. Varies with more slender panicles.

* * *Flowering glume bristle-awned from the tip; flowers short-pedicelled.*

+ *Lower glumes long and bristle-pointed.*

4. **M. sylvática,** Torr. & Gray. (Pl. 8, fig. 1, 2.) Culms ascending, much branched and diffusely spreading (2 – 4° long); contracted *panicles densely many-flowered; lower glumes almost equal, bristle-pointed, nearly as long as the flowering one,* which bears an awn twice or thrice the length of the spikelet. — Low or rocky woods; common. Aug., Sept.

5. **M. ambígua,** Torr. Culms ascending, clustered and branching, 1° high; panicles contracted, densely many-flowered; *spikelet 2-flowered,* the upper flower like the lower and perfect, or more frequently reduced to a mere awn at the base of the lower flower; lower glumes nearly equal, long-pointed; *flowering glume villous,* as long as the lower and equalling the palet, its awn nearly twice longer. — Minn. (shore of Elysian Lake, Waseca Co., *Geyer*). — A remarkable species, approaching Brachyelytrum in the structure of the spikelet, but with wholly the habit of Muhlenbergia.

+ + *Lower glumes short or minute, not or scarcely pointed.*

6. **M. Willdenòvii,** Trin. Culms upright (3° high), slender, simple or sparingly branched; contracted *panicle slender, loosely flowered; lower glumes*

*slightly unequal, short-pointed, half the length of the flowering one,* which bears an awn 3–4 times the length of the spikelet. — Rocky woods; rather common. Aug.

7. **M. diffùsa,** Schreber. (DROP-SEED. NIMBLE WILL.) (Pl. 8, fig. 3–5.) Culms diffusely much branched (8–18′ high); contracted *panicles slender,* rather loosely many-flowered, terminal and lateral; *empty glumes extremely minute, the lower obsolete,* the upper truncate; awn once or twice longer than the flowering glume. — Dry hills and woods, from S. New Eng. to Mich., Iowa, and southward. Aug., Sept. — Spikelets only 1″ long.

§ 2. TRICHÓCHLOA. *Panicle very loose and open, the long branches and pedicels capillary; leaves narrow, often convolute-bristle-form.*

8. **M. capillàris,** Kunth. (HAIR-GRASS.) Culm simple, upright (2° high) from a fibrous root; panicle capillary, expanding (6–20′ long, purple); empty glumes unequal, the lower mostly pointless, the upper more or less bristle-pointed, one third or half the length of the long-awned flowering glume. — Sandy soil, W. New Eng. to N. J., Ky., Mo., and southward. Sept. — Pedicels 1–2′ long, scarcely thicker than the awns, which are about 1′ long.

## 24. BRACHYÉLYTRUM, Beauv. (Pl. 8.)

Spikelets 1-flowered, with a conspicuous filiform pedicel of an abortive second flower about half its length, nearly terete, few, in a simple appressed racemed panicle. Lower glumes unequal, persistent, usually minute, or the lower one almost obsolete. Flowering glume and palet chartaceo-herbaceous, involute, enclosing the linear-oblong grain, somewhat equal, rough with scattered short bristles, the first 5-nerved, extended into a long straight awn, the palet 2-pointed; the awn-like sterile pedicel partly lodged in the groove on its back. Stamens 2; anthers and stigmas very long. — Perennial, with simple culms (1–3° high) from creeping rootstocks, downy sheaths, broad and flat lanceolate pointed leaves, and spikelets ½′ long without the awn. (Name composed of βραχύς, *short,* and ἔλυτρον, *husk,* from the minute glumes.)

1. **B. aristàtum,** Beauv. Rocky woods; common. June. — Var. ENGELMÁNNI, Gray, is a western form, with the second glume awn-pointed, nearly half the length of the flowering one.

## 25. HELEÓCHLOA, Host. (Pl. 7.)

Spikelets 1-flowered, crowded in a dense spike or spike-like panicle. Lower glumes persistent, membranaceous, acute, ciliate-carinate, awnless; flowering glume similar, a little longer, and a little exceeding the palet. Stamens 3. — Low cespitose annuals; spike often scarcely exserted from the upper sheath. (Name from ἕλος, *a meadow,* and χλόα, *grass.*)

**H.** SCHŒNOÌDES, Host. Usually nearly prostrate and tufted; leaves rather rigid, tapering to a sharp point; spike oblong, thick, 7–20″ long. (Crypsis schœnoides, *Lam.*) — Waste places, N. J. to Del. (Nat. from Eu.)

## 26. PHLÈUM, L. CAT'S-TAIL GRASS. (Pl. 7.)

Spikelets 1-flowered, in a very dense cylindrical spike-like panicle. Lower glumes persistent, membranaceous, folded-carinate, subtruncate, mucronate or short-awned; flowering glume hyaline, shorter, truncate. Stamens 3. Styles distinct. — Perennials. (From φλέως, a Greek name for a kind of reed.)

**P. praténse**, L. (Timothy. Herd's-Grass in New Eng. and N. Y.) Tall; *spike long-cylindrical; lower glumes ciliate on the back, tipped with a short bristle.* — Meadows, commonly cultivated for hay. (Nat. from Eu.)

1. **P. alpìnum**, L. Low; *spike ovate-oblong;* lower glumes strongly ciliate on the back, tipped with a rough *awn about their own length.* — Alpine tops of the White Mountains, N. H., and high northward. (Eu.)

### 27. ALOPECÙRUS, L. Foxtail Grass. (Pl. 7.)

Spikelets 1-flowered, jointed on the pedicel. Lower glumes boat-shaped, strongly compressed and keeled, nearly equal, united at base, equalling or exceeding the flowering glume, which is awned on the back below the middle; palet mostly wanting! Stamens 3. Styles mostly united. Stigmas long and feathered. — Clusters contracted into a cylindrical and soft dense spike; perennial. (Name from ἀλώπηξ, *fox*, and οὐρά, *tail*, from the shape of the spike.)

**A. praténsis**, L. (Meadow Foxtail.) Culm upright, smooth (2° high); the upper leaf much shorter than its inflated sheath; spike stout, 1½ – 2½′ long; *flowering glume equalling the acute lower glumes; awn exserted more than half its length, twisted.* — Meadows and pastures, eastward. May. (Nat. from Eu.)

**A. geniculàtus**, L. (Floating F.) (Pl. 7, fig. 1 – 4.) Culm ascending, often bent at the lower joints; upper leaf as long as its sheath; spike slender, 1 – 2′ long; *flowering glume rather shorter than the obtuse lower glumes, the awn from near its base and projecting from half to twice its length beyond it.* — Moist meadows, eastward. June – Aug. (Nat. from Eu.)

Var. **aristulàtus**, Torr. The awn very slender and scarcely exserted. (A. aristulatus, *Michx.*) — In water and wet places; common. June – Aug.

### 28. SPORÓBOLUS, R. Br. Drop-seed Grass. Rush-Grass. (Pl. 7.)

Spikelets small, 1- (rarely 2-) flowered, in an open or contracted or spiked panicle. Lower glumes persistent, 1 – 3-nerved, not awned or pointed, the lower smaller; flowering glume of the same texture as the lower ones (membranaceo-chartaceous) and usually longer than they, naked, awnless and mostly pointless, 1-nerved (rarely somewhat 3-nerved); palet similar, 2-nerved. Stamens chiefly 3. Stigmas simply feathery. Grain globular to oblong or cylindrical, deciduous, often very thin, containing the loose seed. — Culms wiry or rigid. Leaves involute, the throat usually bearded, and sheaths often enclosing the panicles. (Name from σπορά, *seed*, and βάλλω, *to cast forth.*)

* *Panicle contracted, often simple; grain oval or oblong; perennial, except* n. 2.

1. **S. ásper**, Kunth. Culms tufted (2 – 4° high); lowest leaves very long, rigid, rough on the edges, tapering to a long involute and thread-like point, the upper short, involute; sheaths partly or at first wholly enclosing the contracted panicle; *flower much longer than the unequal lower glumes;* grain oval or oblong. (Vilfa aspera, *Beauv.*) — Sandy fields and dry hills, especially southward. Sept. — Spikelets 2 – 3″ long. Flowering glume and palet rough above, smooth or hairy below, the palet tapering upward, acute, and one half to twice longer than the glume, or else obtuse and equalled or even considerably exceeded by the glume!

2. **S. vaginæflòrus**, Vasey. (Pl. 7, fig. 4, 5.) Culms slender (6 – 12′ high), ascending; leaves involute-awl-shaped (1 – 4′ long); panicles simple and spiked, the lateral and often the terminal concealed in the sheaths; *flower-*

*ing glume and palet somewhat equal, acute, about the length of the nearly equal lower glumes,* only ⅓ longer than the oval grain. (Vilfa vaginæflora, *Torr.*) — Barren and sandy dry fields; common, especially southward. Sept.

3. **S. cuspidàtus,** Torr. Erect culms and appressed leaves more slender than in the preceding; *panicle exserted,* very simple and narrow; spikelets smaller, the lower *glumes acuminate,* little shorter than the cuspidate upper one. (Vilfa cuspidata, *Torr.*) — Maine (on the St. John's River, *G. L. Goodale*); also Iowa, Minn., and common westward.

4. **S. depauperàtus,** Vasey. Resembling n. 3, but the culms decumbent at base and matted, the leaves short and usually widely spreading, and the lower glumes barely acute, not half the length of the upper one. — W. Minn. to Kan., and southwestward.

5. **S. Virgínicus,** Kunth. *Culms* tufted, slender (5 – 12′ long), often procumbent, *branched;* leaves convolute, rigid; palets rather shorter than the nearly equal acute glumes. (Vilfa Virginica, *Beauv.*) — Sandy seashore, Virginia (*Clayton*) and southward. — Spikelets much smaller and more numerous than in the others.

6. **S. mìnor,** Vasey. Culms tufted, very slender, geniculate and ascending, simple, 1° high; leaves short and narrow; peduncles little exserted from the sheaths; spikelets (1½ – 2″ long) in a very narrow simple compressed panicle (1 – 2′ long), not crowded; glumes and palet nearly equal, acute or some what acuminate. — Va. to N. C., Tenn. and Tex.

**S. Índicus,** R. Br. Culms stout, erect, 2 – 3° high; leaves elongated, attenuate; panicle very narrow, 6 – 18′ long, the densely crowded spikelets ½″ long. — On ballast, and naturalized southward. (From Trop. Am.)

* * *Panicle pyramidal, open; glumes very unequal; grain globose, utricular; perennials.*

7. **S. júnceus,** Kunth. *Leaves involute,* narrow, rigid, the lowest elongated; culm (1 – 2° high) naked above, bearing a narrow loose panicle; empty *glumes ovate, rather obtuse,* the lower one half as long as, *the upper equalling, the nearly equal flowering glume and palet.* — Dry soil, Penn. to Wisc. and Minn., and (chiefly) south to Fla. Aug. — Spikelets 1 – 2″ long, shining.

8. **S. heterólepis,** Gray. *Leaves involute-thread-form,* rigid, the lowest as long as the culm (1 – 2°) which is naked above; panicle very loose; empty *glumes very unequal; the lower awl-shaped* (or bristle-pointed from a broad base) and somewhat shorter, *the upper ovate-oblong and taper-pointed and longer, than the equal flowering glume and palet.* — Dry soil, Conn. and N. Y. to Minn., Neb., and Mo. Aug. — Plant exhaling an unpleasant scent (*Sullivant*), stouter than the last, the spikelets thrice larger. Utricle 1″ in diameter, shining, thick and coriaceous!

9. **S. cryptándrus,** Gray. (Pl. 7, fig. 1 – 3.) Culm 2 – 3° high; *leaves flat,* pale (2″ wide); the pyramidal lead-colored *panicle bursting from the upper sheath* which usually encloses its base, its spreading branches hairy in the axils; spikelets 1″ long; *upper empty glume lanceolate, rather acute, twice the length of the lower one,* as long as the nearly equal flowering glume and palet; sheaths strongly bearded at the throat. — Sandy shores, coast of New Eng. and of the Great Lakes, Minn. to Kan., and westward. Aug., Sept.

10. **S. airoides,** Torr. Culm tufted, often stout, erect, ½–3° high; leaves strongly revolute and attenuate, rather rigid; panicle open and diffuse, broadly pyramidal, glabrous; spikelets solitary on slender pedicels, 1″ long; lower glumes unequal, rather obtuse. — Neb. to Tex., and westward.

**S.** ASPERIFÒLIUS, Thurb., a similar but smaller species, with thinner and shorter leaves very rough on the margin, the inflorescence scabrous, and spikelets smaller, with the glumes nearly equal, is very common westward, and probably occurs within our limits — as also S. CONFÙSUS, Vasey (S. ramulosus of authors, not *Kunth*), a low slender annual, with very short culms and a delicate diffuse panicle, the very small spikelets (½″ long) on filiform-clavate pedicels.

* * * *Empty glumes almost equal; panicle racemose-elongated, open, the pedicels capillary; sheaths naked at the throat; spikelets not unfrequently two-flowered; perennial.*

11. **S. compréssus,** Kunth. Very smooth, *leafy to the top; culms tufted, stout, very flat;* sheaths flattened, much longer than the internodes; *leaves erect,* narrow, conduplicate-channelled; empty glumes acutish, about one third shorter than the obtuse flowering one. — Bogs, on Long Island and in the pine-barrens of N. J. Sept. — Forming strong tussocks, 1–2° high. Panicle 8–12′ long; spikelets 1″ long, purplish.

12. **S. serótinus,** Gray. Smooth; *culms very slender, flattish* (8–15′ high), *few-leaved;* leaves very slender, channelled; *panicle soon much exserted,* the diffuse capillary branches scattered; glumes ovate, obtuse, about half the length of the flower. — Sandy wet places, Maine to N. J. and Mich. Sept. — A very delicate grass; the spikelets half a line long.

## 29. AGRÓSTIS, L. Bent-Grass. (Pl. 7.)

Spikelets 1-flowered, in an open panicle. Empty glumes somewhat equal, or the lower rather longer, usually longer than the flowering one, pointless. Flowering glume and palet very thin, pointless, naked; the first 3–5-nerved, frequently awned on the back; the palet often minute or none. Stamens chiefly 3. Grain (caryopsis) free. — Culms usually tufted, slender; root commonly perennial. (Name from ἀγρός, *a field,* the place of growth.)

§ 1. AGROSTIS proper. *Palet manifest, but shorter than the glume.*

**A.** ÁLBA, L. (Fiorin or White Bent-Grass.) Rootstocks creeping or stoloniferous; culms 1–2° high, often decumbent at base; leaves short, flat, the ligule long and acute; panicle contracted after flowering, greenish, purplish or brownish, the branches slightly rough; flowering glume nearly equalling the empty ones, 3-nerved, rarely short-awned, the palet about half as long. — Meadows and fields, a valuable grass; naturalized from Eu. and cultivated, and perhaps native north and westward.

Var. VULGÀRIS, Thurb. (Red Top. Herd's-Grass of Penn., etc.) (Pl. 7, fig. 1, 2.) Panicle more or less spreading after flowering; ligule short and truncate. (A. vulgaris, *With.*) — Low meadows and pastures; nat. from Eu. and cultivated, also perhaps indigenous.

1. **A. arachnoides,** Ell. Culms (1° high) and leaves very slender; panicle open, weak and drooping; glumes nearly equal, roughish on the keel and margins, the flowering glume shorter, with 2 minute bristles at the truncate apex and a long exceedingly delicate awn on the back above the middle; palet minute. — Mo. to Ky., Tenn., and S. Car.

2. **A. exaràta,** Trin. Culms erect, 1 – 2° high; leaves mostly erect; panicle narrow, crowded, greenish, the rays mostly flower-bearing to the base; spikelets 1½ – 2″ long; glumes nearly equal, acute, the flowering ones shorter, sometimes awned above the middle. — Wisc. (*Vasey*) to Sask., and far westward.

§ 2. TRICHÒDIUM. *Palet abortive, minute, or none.*

3. **A. elàta,** Trin. *Culms firm or stout* (2 – 3° high); leaves flat (1 – 2″ wide); upper ligules elongated (2 – 3″ long); *spikelets crowded on the branches of the spreading panicle above the middle* (1½″ long); flowering glume awnless, slightly shorter than the rather unequal lower ones; the palet wanting. — Swamps, N. J. and southward. Oct.

4. **A. perénnans,** Tuckerm. (Thin-Grass.) *Culms slender,* erect from a decumbent base (1 – 2° high); leaves flat (the upper 4 – 6′ long, 1 – 2″ wide); *panicle at length diffusely spreading, pale green; the branches short, divided and flower-bearing from or below the middle; flowering glume awnless* (rarely short-awned), shorter than the unequal lower ones; the palet minute or obsolete. — Damp shaded places. July, Aug. — Spikelets, etc., as in n. 5, into which it seems to vary.

5. **A. scàbra,** Willd. (Hair-Grass.) (Pl. 7, fig. 3.) *Culms very slender,* erect (1 – 2° high); leaves short and narrow, the lower soon involute (the upper 1 – 3′ long, less than 1″ wide); *panicle very loose and divergent, purplish, the long capillary branches flower-bearing at and near the apex; flowering glume awnless or occasionally short-awned* on the back, shorter than the rather unequal very acute empty ones; the palet minute or obsolete; root biennial? — Exsiccated places; common. June – Aug. — Remarkable for the long and divergent capillary branches of the extremely loose panicle; these are whorled, rough with very minute bristles (under a lens), as also the keel of the glumes. Spikelets 1″ long. A dwarf mountain form occurs, growing in tufts in hollows of rocks, etc. — A variety (?) from about the White Mountains, etc. (var. montana, *Tuckerm.*), has a more or less exserted awn.

6. **A. canìna,** L. (Brown Bent-Grass.) Culms 8′ – 2° high; root-leaves involute-bristle-form, those of the culm flat and broader; panicle loose; lower glumes slightly unequal, ovate-lanceolate, very acute, the flowering one *exsertly awned on the back* at or below the middle; spikelets brownish or purplish, rarely pale or greenish (1 – 1½″ long). — Meadows, sparingly naturalized eastward. A mountain form with shorter and more spreading panicle (A. Pickeríngii & A. concinna, *Tuckerm.*, A. canina, var. alpina, *Oakes*, & Ed. 2, and essentially A. rubra, *L.* ex *Wahl.*, and A. borealis, *Hartm.*) is indigenous on mountain-tops, Maine to N. Y.; also an ampler form in the Alleghanies of Penn. and southward (A. rupéstris, *Chapman*, etc.). July – Aug. (Eu.)

### 30. POLYPÒGON, Desf. Beard-Grass. (Pl. 8.)

Spikelets 1-flowered, in a contracted, mostly spike-like panicle. Empty glumes nearly equal, long-awned, much longer than the membranaceous flowering one which is commonly short-awned below the apex. Stamens 3. Grain free. (Name composed of *πολύ, much,* and *πωγών, beard.*)

**P.** Monspeliénsis, Desf. Panicle interrupted; lower glumes oblong, the awn from a notch at the summit, the flowering one also awned; root annual. — Isles of Shoals (*Robbins*), ballast heaps, and southward. (Nat. from Eu.)

### 31. CÍNNA, L. Wood Reed-Grass. (Pl. 8.)

Spikelets 1-flowered, much flattened, crowded in an open flaccid panicle. Empty glumes persistent, lanceolate, acute, strongly keeled, rough-serrulate on the keel; the lower rather smaller, the upper a little exceeding the flower, which is manifestly stalked, smooth and naked; flowering glume much like the lower, longer than the palet, usually short-awned or mucronate on the back below the pointless apex. Stamen one, opposite the 1-nerved palet! Grain linear-oblong, free. — A perennial, rather sweet-scented grass, with simple and upright somewhat reed-like culms (2 – 7° high), bearing an ample compound terminal panicle, its branches in fours or fives; the broadly linear-lanceolate flat leaves (4 – 6″ wide) with conspicuous ligules. Spikelets green, often purplish-tinged. (From *κίννα*, a name in Dioscorides for a kind of grass.)

1. **C. arundinàcea,** L. (Pl. 8, fig. 1, 2.) Panicle 6 – 15′ long, rather dense, the branches and pedicels spreading in flower, afterward erect; spikelets 2½ – 3″ long; awn of the glume either obsolete or manifest. — Moist woods and shaded swamps; rather common. July, Aug.

2. **C. péndula,** Trin. Panicle loose and more slender, the branches nearly capillary and drooping in flower; pedicels very rough; glumes thinner, the lower less unequal; spikelets 1½ – 2″ long; palet obtuse. (C. arundinacea, var. pendula, *Gray*.) — Deep damp woods, N. New Eng. to Lake Superior and northward, and on mountains southward. (Eu.)

### 32. APÈRA, Adans.

With the characters of Agrostis; distinguished by the presence of a second rudimentary flower in the form of a short bristle, and by the 2-toothed palet little shorter than the flowering bifid glume, which is dorsally awned. — A rather late annual, with narrow flat leaves, and a contracted or spreading panicle with numerous filiform branches and very numerous small shining spikelets. (Name from *ἄπηρος*, *unmaimed*; application obscure.)

**A.** SPÌCA-VÉNTI, Beauv. Spikelets ½ – 1″ long. — Sparingly naturalized. (Nat. from Eu.)

### 33. CALAMAGRÓSTIS, Adans. Reed Bent-G. (Pl. 8.)

Spikelets 1-flowered, and (in our species) often with a pedicel or rudiment of a second abortive flower (rarely 2-flowered), in an open or spiked panicle. Lower glumes mostly membranaceous, keeled or boat-shaped, often acute, commonly nearly equal, and exceeding the flower, which bears at the base copious white bristly hairs; flowering glume thin, bearing a slender awn on the back or below the tip, or sometimes awnless; the palet mostly shorter. Stamens 3. Grain free. — Perennials, with running rootstocks, and mostly tall and simple rigid culms. (Name compounded of *κάλαμος*, *a reed*, and *ἀγρόστις*, *a grass*.)

§ 1. DEYEÙXIA. *Rudiment of a second flower present in the form of a plumose or hairy small pedicel behind the palet (very rarely more developed and having a glume or even stamens); glumes membranaceous, or the flowering one thin and delicate, the latter 3 – 5-nerved and awn-bearing.*

* *Panicle loose and open, even after flowering; the mostly purple-tinged or lead-colored strigose-scabrous glumes not closing in fruit; copious hairs of the*

*rhachis about equalling the flowering glume, not surpassed by those of the rudiment; awn delicate, straight.*

1. **C. Canadénsis,** Beauv. (Blue-Joint Grass.) (Pl. 8, fig. 1, 2.) Culm tall (3 - 5° high); leaves flat when fresh, glaucous; panicle oblong; *glumes ovate-lanceolate*, acute, 1¼ - 1½″ long; *awn* from near the middle of the upper glume, not exceeding and *scarcely stouter than the basal hairs.* (Deyeuxia Canadensis, *Hook. f.*) — Wet grounds; common northward. July.

2. **C. Langsdórffii,** Trin. Spikelets larger, 2½ - 3″ long; *glumes lanceolate or oblong-lanceolate and gradually taper-pointed;* awn stouter; otherwise like the preceding. (Deyeuxia Langsdorffii, *Kunth.*) — Mountains of N. New Eng., L. Superior, and northward. (Eu.)

* * *Panicle strict, its short branches appressed or erect after flowering, and the glumes mostly closed; flowering glume less delicate, roughish, sometimes of as firm texture as the lower; awn stouter.*

+ *Leaves narrow, inclined to be involute; awn straight.*

3. **C. strícta,** Trin. Panicle glomerate and lobed, strict, 2 - 4′ long; glumes 1½ - 2″ long, ovate-oblong, not acuminate; hairs scarcely or little shorter than the flower, and as long as those of the rudiment; awn from the middle of the thin flowering glume or lower, and barely exceeding it. (Deyeuxia neglecta, *Kunth*?) — Mountains of N. New Eng., Lake Superior, and north and westward. (Eu.)

4. **C. Lappónica,** Trin. Culm and rootstocks stouter than in C. stricta; the narrow panicle less dense, and purplish spikelets larger; glumes fully 2″ long, tapering to a point; awn from much below the middle of the glume, stout. (Deyeuxia Lapponica, *Kunth.*) — Isle Royale, Lake Superior, to Lab., north and westward. Aug. (Eu.)

+ + *Leaves broader, flat; awn stouter, bent, divergent, or twisted when dry.*

5. **C. confìnis,** Nutt. Tall; *panicle* elongated (4 - 6′), its rather slender branches *spreading at flowering-time*, afterward appressed; glumes lance-oblong, very acute, 2″ long, pale; *hairs of the flower copious, equal*, slightly or one third shorter than the thin flowering glume and than those of the rudiment; awn borne much below the middle of the glume, somewhat surpassing it; grain glabrous. (Deyeuxia confinis, *Kunth.*) — Swamps, N. and W. New York (especially Penn Yan, *Sartwell*) and Penn.; Minn., and westward. July.

6. **C. Nuttalliàna,** Steud. Culm stout (3 - 5° high); *panicle contracted and spike-like;* glumes lanceolate and tapering into slender awl-shaped tips, 3″ long; *hairs on the lower side scanty and barely half the length of the firm and keeled flowering glume,* on the other side longer and equalling the copious tuft on the summit of the rudiment; awn borne half-way between the middle and the tapering tip of the glume, stout, not twisted; grain bearded at the top. (Deyeuxia Nuttalliana, *Vasey.*) — Moist grounds, E. New Eng. to Penn., Va., and southward. Aug.

7. **C. Pórteri,** Gray. Culm slender (2 - 4° high); a woolly-bearded ring at the junction of the broadly linear leaves with the sheath; *panicle long and narrow,* with the branches appressed; glumes lanceolate, acute, pale, 2 - 2½″ long; *hairs of the flower and of the short rudiment scanty,* and both reaching about to the middle of the flower behind the palet, but *very short or none at the*

*base of the firm-membranaceous flowering glume*, which bears near its base *a twisted awn* of its own length. (Deyeuxia Porteri, *Vasey.*) — Dry woods, Pulpit Rocks and vicinity, Huntingdon Co., Penn., *Prof. T. C. Porter.*

8. **C. Pickeríngii,** Gray. Culm 1 – 1½° high; *leaves short; panicle pyramidal*, purplish; glumes ovate-oblong, bluntish or bluntly pointed (1½ – 2″ long); *hairs both of the flower and of the rudiment very short* and scanty, one fourth or fifth the length of the flower, none behind the obtuse flowering glume, which bears between its middle and base a short stout (straight or bent, not twisted) awn. (Deyeuxia Pickeringii, *Vasey.*) — White Mts., in the alpine region of Mt. Washington, and a more luxuriant form with smaller spikelets at Echo Lake, Franconia; Andover, Mass. (*J. Robinson*); Cape Breton.

§ 2. CALAMOVÍLFA. *Rudiment of second flower wanting; glumes and palet rather chartaceous, compressed-keeled; flowering glume* 1-*nerved, entirely awnless; palet strongly 2-keeled; panicle at length open and loose.*

9. **C. brevípilis,** Gray. Branches of the diffuse pyramidal panicle capillary (purplish); empty *glumes ovate*, mucronate; the upper slightly, the lower nearly one half shorter than the *flowering glume and palet*, which are *more than twice the length of the hairs and bristly-bearded along the keels.* (Ammophila brevipilis, *Benth.*) — Sandy swamps, pine-barrens of N. J.; rare. Sept. — Culm 2 – 4° high; leaves nearly flat; spikelets 2″ long.

10. **C. longifòlia,** Hook. Culm (1 – 4° high) stout, from thick running rootstocks; *leaves rigid, elongated, involute* above and tapering into a long thread-like point; panicle at first close, becoming open and pyramidal, the branches smooth; *glumes lanceolate*, the upper as long as the flower, the lower ¼ shorter; *the copious hairs more than half the length of the naked flower.* (Ammophila longifolia, *Benth.*) — Sands, along the upper Great Lakes, from Ill. and Mich. to Dak., Kan., and westward. Aug. — Spikelets 2½ – 3″ long.

## 34. AMMÓPHILA, Host. (Pl. 15.)

Spikelets large, in a contracted spike-like panicle, 1-flowered, with a pedicel-like rudiment of a second flower (plumose above), the flower hairy-tufted at base. Empty glumes scarious-chartaceous, lanceolate, compressed-keeled, nearly equal; flowering glume and palet similar, a little shorter, the glume 5-nerved, slightly mucronate or obscurely awned near the tip, the palet 2-keeled. — A coarse perennial maritime species, with running rootstocks. (Name from ἄμμος, *sand*, and φιλέω, *to love.*)

1. **A. arundinàcea,** Host. (Sea Sand-Reed.) Culm stout and rigid (2 – 3° high) from firm running rootstocks; leaves long, soon involute; panicle contracted into a dense cylindrical spike (5 – 9′ long); spikelets 5 – 6″ long; hairs only one third of the length of the flower. (Calamagrostis arenaria, *Roth.*) — Sandy beaches, N. J. to Maine and northward, and on the Great Lakes. Aug. (Eu.)

## 35. ARRHENATHÈRUM, Beauv. Oat-Grass. (Pl. 12.)

Spikelets open-panicled, 2-flowered, with the rudiment of a third flower; the middle flower perfect, its glume barely bristle-pointed from near the tip; the lowest flower staminate only, bearing a long bent awn below the middle of the back (whence the name, from ἄῤῥην, *masculine*, and ἀθήρ, *awn*); — otherwise as in Avena, of which it is only a peculiar modification.

**A.** avenàceum, Beauv. Root perennial; culm 2–4° high; leaves broad, flat; panicle elongated; glumes scarious, very unequal. — Meadows and lots; absurdly called *Grass of the Andes.* May–July. (Nat from Eu.)

### 36. HÓLCUS, L. (partly). Meadow Soft-Grass. (Pl. 12.)

Spikelets crowded in an open panicle, 2-flowered; the boat-shaped membranaceous glumes enclosing and much exceeding the remotish flowers. Lower flower perfect, its papery or thin-coriaceous glume awnless and pointless; the upper flower staminate, otherwise similar, but bearing a stout bent awn below the apex. Stamens 3. Styles plumose to the base. Grain free. (A name in Pliny for a kind of grass, from *ὁλκός, attractive,* of obscure application.)

**H.** lanàtus, L. (Velvet-Grass.) Perennial, soft-downy and pale; panicle oblong; upper empty glume mucronate-awned under the apex; awn of the staminate flower curved. — Moist meadows. June. (Nat. from Eu.)

### 37. AÌRA, L. Hair-Grass.

Spikelets very small, in an open diffuse panicle, of 2 perfect contiguous flowers. Glumes thin-membranaceous, the two lower persistent, nearly equal, acute, keeled; the flowering ones obscurely nerved, acutely 2-cleft at the apex, bearing a slender twisted awn below the middle. Stamens 3. Styles plumose to the base. Grain oblong, adnate. — Low annuals, with short setaceous leaves (An ancient Greek name for Darnel.)

**A.** caryophýllea, L. Culms 5–10′ high, bearing *a very diffuse panicle* of purplish and at length *silvery scarious spikelets.* — Dry fields, Nantucket; also Newcastle, Del., *W. M. Canby.* (Nat. from Eu.)

**A.** præcox, L. Culms tufted, 3–4′ high; branches of the *small and dense panicle* appressed; awn from below the middle of the glume. — Sandy fields, N. J. to Va.; rare. (Nat. from Eu.)

### 38. DESCHÁMPSIA, Beauv. (Pl. 12.)

Spikelets small, panicled, of 2 perfect flowers and the hairy pedicel or rudiment of a third (rarely staminate); rhachis hairy. Empty glumes persistent, membranaceous and shining, carinate, acute, nearly equal; flowering glumes toothed or erose-denticulate at the truncate summit, usually delicately 3–5-nerved, with a slender twisted awn near or below the middle. Grain oblong, free. — Root perennial. (Named for Loiseleur-*Deslongchamps,* a French botanist.)

* *Empty glumes somewhat shorter than the flowers.*

1. **D. flexuòsa,** Trin. (Common Hair-Grass.) (Pl. 12, fig. 1–3.) Culms slender, nearly naked (1–3° high) above the small tufts of *involute bristle-form root-leaves* (1–6′ long); branches of the small spreading panicle capillary; *awn longer than the palet, at length bent and twisted.* (Aira flexuosa, *L.*) — Dry places; common. June. (Eu.)

2. **D. cæspitòsa,** Beauv. Culm tufted (2–4° high); *leaves flat, linear;* panicle pyramidal or oblong (6′ long); *awn straight, barely equalling the glume.* (Aira cæspitosa, *L.*) — Shores of lakes and streams; N. Eng. to Penn., Mich., and northward. June, July. (Eu.)

* * *Empty glumes longer than the flowers,* 2–2½″ *long.*

3. **D. atropurpùrea,** Scheele. Culms 8–15′ high, weak; leaves flat, rather wide; panicle of few spreading branches; awn stout, twice longer than the nerveless truncate ciliolate-denticulate glume. (Aira atropurpurea, *Wahl.*) — Alpine summits of N. H. and N. Y., to Lab. and northward. Aug. (Eu.)

## 39. TRISÈTUM, Persoon. (Pl. 12.)

Spikelets 2 – several-flowered, often in a contracted panicle; the flowering glume compressed-keeled, of about the same thin-membranaceous texture as the empty glumes, bearing a bent or flexuous (rarely twisted) awn at or below the sharply 2-toothed or 2-pointed apex (whence the name, from *tris*, three, and *seta*, a bristle); otherwise nearly as in Avena. Ours are perennials.

1. **T. subspicàtum,** Beauv., var. **mólle,** Gray. (Pl. 12, fig. 1, 2.) *Minutely soft-downy; panicle dense, much contracted,* oblong or linear (2 – 3′ long); glumes about the length of the 2 – 3 smooth flowers; awn dorsal, diverging, much exserted. — Mountains and rocky river-banks, N. New Eng. to L. Superior, and northward. July. — About 1° high; leaves flat, short. (Eu.)

2. **T. palústre,** Torr. *Smooth; panicle* rather long and narrow (5′ long), *loose, the branches capillary; spikelets flat* (3″ long); lower glumes shorter than the two smooth lanceolate flowers; the upper flower on a slightly hairy joint of the rhachis, with a slender spreading or bent awn next the short 2-pointed tip, the *lower commonly awnless* or only mucronate-pointed. — Low grounds, southern N. Y. to Ill., and southward. June. — Culm slender, 2 – 3° high; leaves flat, short; spikelets yellowish-white, tinged with green.

## 40. AVÈNA, Tourn. OAT. (Pl. 12.)

Spikelets 2 – many-flowered, panicled; the flowers herbaceo-chartaceous, or becoming harder, of firmer texture than the large and mostly unequal empty glumes; the uppermost flower imperfect; rhachis and base of the flower often bearded. Flowering glume rounded on the back, mostly 5 – 11-nerved, bearing a long usually bent or twisted awn on the back or between the two acute teeth at the apex, proceeding from the mid-nerve only. Stamens 3. Grain oblong-linear, grooved on one side, usually hairy at least at the top, free, but invested by the palet. (The classical Latin name.)

* *Spikelets large* (1′ *long*); *annual.*

**A.** FÁTUA, L. Resembling the common oat (*A. sativa*), the few spikelets in a loose panicle, mostly pendulous; flowering glumes covered with long brownish hairs and bearing a bent awn 1 – 2′ long. — Wisc., Minn. (Nat. from Eu.)

* * *Smaller-flowered perennials.*

1. **A. striàta,** Michx. (Pl. 12, fig. 1, 2.) *Glabrous* and *smooth* throughout, slender (1 – 2° high); leaves narrow; ligule short, truncate; panicle simple, loose; spikelets (6″ long) on capillary pedicels, 3 – 6-flowered, much exceeding the scarious-margined purple acute empty glumes; *lower glume* 1-, *upper* 3-*nerved;* rhachis smooth; *flowers short-bearded at base;* flowering glume 7-nerved, much longer than the ciliate-fringed palet (4″ long), mostly shorter than its soon bent or divergent awn, which rises just below the tapering very sharply cuspidate 2-cleft tip. — Rocky, shaded hills, N. New Eng., N. Y., and northwestward. June.

2. **A. Smíthii,** Porter. Taller (2½ – 4½° high), rather stout; leaves broadly linear (3 – 6″ wide) and taper-pointed, flat, and with the sheaths and culm *retrorsely scabrous;* ligule elongated, acute; panicle larger (6 – 12′ long), the few branches at length spreading; empty glumes slightly purplish, the lower 3-nerved, the upper 5-nerved, scabrous on the nerves; rhachis minutely hispid,

*flowers* (3 – 5) *naked* at base; awn straight, ⅓ – ½ the length of the 7-nerved glume. — N. Mich. and Isle Royale, L. Superior. April, May.

### 41. DANTHÒNIA, DC. Wild Oat-Grass. (Pl. 12.)

Flowering glume (oblong or ovate, rounded-cylindraceous, 7 – 9-nerved) bearing between the sharp-pointed or awn-like teeth of the tip an awn usually composed of the 3 middle nerves, which is flattish and spirally twisting at base; otherwise nearly as in Avena. Empty glumes longer than the imbricated flowers. Ours perennials, 1 – 2° high, with narrow and soon involute leaves, hairy sheaths bearded at the throat, and a small simple panicle or raceme of about 7-flowered spikelets. (Named for *Danthoine*, a French botanist.)

1. **D. spicàta,** Beauv. (Pl. 12, fig. 1 – 3.) Culms tufted, low; leaves short, very narrow; spikelets few, 3 – 5″ long, *subspicate; flowering glume loosely hairy, its teeth short and pointless.* — Dry and sterile or rocky soil.

2. **D. serícea,** Nutt. Culms taller and not tufted (1 – 3° high), *terete;* leaves larger, *at least the sheaths silky-villous;* spikelets more numerous and panicled, 6 – 9″ long; *flowering glume very silky-villous, tipped with slender awn-pointed teeth.* — Dry or moist sandy soil, southern Mass., N. J., and southward; rare. June.

3. **D. compréssa,** Aust. Culms slender, 2° high, somewhat compressed, paler and subcaniculate on the narrower side; leaves elongated, very narrow, villous only at the summit of the sheath; spikelets 6 – 12, loosely panicled, 5″ long; flowering glume loosely hairy or pubescent, the teeth very long-awned. — Dry banks; Vt. (*Pringle*); E. Mass., N. Y., Penn., and mountains of N. C.

### 42. CÝNODON, Richard. Bermuda or Scutch-Grass. (Pl. 9.)

Spikelets 1-flowered, with a mere naked short-pedicelled rudiment of a second flower, imbricate-spiked on one side of a flattish rhachis; the spikes usually digitate at the naked summit of the flowering culms. Empty glumes keeled, pointless, rather unequal; flowering glume and palet pointless and awnless, the glume larger, boat-shaped. Stamens 3. — Low diffusely branched and extensively creeping perennials, with short flattish leaves. (Name composed of *κύων, a dog,* and *ὀδούς, a tooth.*)

**C.** Dáctylon, Pers. Spikes 3 – 5; flowering glume smooth, longer than the blunt rudiment. — Penn., and southward, where it is cultivated for pasturage. (Nat. from Eu.)

### 43. CTÉNIUM, Panzer. Toothache-Grass. (Pl. 9.)

Spikelets densely imbricated in two rows on one side of the flat curved rhachis of the solitary terminal spike. Glumes persistent; the lower (interior) much smaller; the other concave below, bearing a stout recurved awn, like a horn, on the middle of the back. Flowers 4 – 6, all but one neutral; the one or two lower consisting of empty awned glumes, and the one or two uppermost of empty awnless glumes; the perfect flower intermediate, its glume membranaceous, awned or mucronate below the apex and densely ciliate toward the base, 3-nerved. Stamens 3. Stigmas plumose. (Name *κτενίον, a small comb,* from the pectinate appearance of the spike.)

1. **C. Americànum,** Spreng. Culm (3 – 4° high from a perennial root) simple, pubescent or roughish; larger glume warty-glandular outside, conspicuously awned. — Wet pine-barrens, S. Va. and southward. — Taste very pungent.

### 44. GYMNOPÒGON, Beauv. (Pl. 9.)

Spikelets of one perfect flower, and the rudiment of a second (consisting of an awn-like pedicel mostly bearing a naked bristle), sessile and remotely alternate on long filiform rays or spikes, which form a crowded naked raceme. Glumes lance-awl-shaped, keeled, almost equal, rather longer than the membranaceous flowering glume, which is cylindrical-involute, with the midrib produced from just below the 2-cleft apex into a straight and slender bristle-like awn; palet nearly as long, with the abortive rudiment at its base. Stamens 3. Stigmas pencil-form, purple. — Root perennial. Leaves short and flat, thickish, 1 – 3′ long. (Name composed of *γυμνός*, *naked*, and *πώγων*, *a beard*, alluding to the reduction of the abortive flower to a bare awn.)

1. **G. racemòsus,** Beauv. (Pl. 9, fig. 1, 2.) Culms clustered from a short rootstock (1° high), wiry, leafy; leaves oblong-lanceolate; *spikes flower-bearing to the base* (5 – 8′ long), soon divergent; awn of the abortive flower shorter than its stalk, equalling the *pointed glumes*, not more than half the length of the awn of the fertile flower. — Sandy pine-barrens, N. J. to Va., and southward. Aug., Sept.

2. **G. brevifòlius,** Trin. Filiform *spikes long-peduncled, i. e. flower-bearing* only above the middle; flowering glume ciliate near the base, short-awned; *awn of the abortive flower obsolete or minute; glumes acute.* — Sussex Co., Del., and southward.

### 45. SCHEDONNÁRDUS, Steud. (Pl. 11.)

Spikelets small, acuminate, 1-flowered, appressed-sessile and scattered along one side of the slender rhachis of the distant sessile and divaricately spreading spikes. Empty glumes persistent, narrow, acuminate, more or less unequal, the longer usually a little shorter than the rather rigid acuminate flowering one. Stamens 3. Styles distinct. Grain linear. — A low slender annual, branching from the base, with short narrow leaves. (Name from *σχεδόν*, *near*, and *Nardus*, from its resemblance to that genus.)

1. **S. Texànus,** Steud. Stem (6 – 20′ long) naked and curved above, bearing 3 – 9 racemosely disposed thread-like and triangular spikes 1 – 3′ long; spikelets $1\frac{1}{2}''$ long. (Lepturus paniculatus, *Nutt.*) — Open grounds and salt-licks, Ill. to Mont., Col., and Tex. Aug.

### 46. BOUTELOÙA, Lagasca. MUSKÍT-GRASS. (Pl. 9.)

Spikelets crowded and closely sessile in 2 rows on one side of a flattened rhachis, comprising one perfect flower below and one or more sterile (mostly neutral) or rudimentary flowers. Glumes convex-keeled, the lower one shorter. Perfect flower with the 3-nerved glume 3-toothed or cleft at the apex, the 2-nerved palet 2-toothed; the teeth, at least of the former, pointed or subulate-awned. Stamens 3; anthers orange-colored or red. — Rudimentary flowers mostly 1 – 3-awned. Spikes solitary, racemed or spiked; the rhachis somewhat extended beyond the spikelets. (Named for *Claudius Boutelou*, a Spanish writer upon floriculture and agriculture.)

§ 1. CHONDRÒSIUM. *Spikes pectinate, of very many spikelets, oblong or linear, very dense, solitary and terminal or few in a raceme; sterile flowers 1 – 3 on a short pedicel, neutral, consisting of 1 – 3 scales and awns.*

1. **B. oligostàchya,** Torr. Glabrous, perennial (6 – 12′ high); *leaves very narrow;* spikes 1 – 5, the rhachis glabrous; *glumes all sparingly soft-hairy,* the lobes awl-pointed; *sterile flower copiously villous-tufted* at the summit of the naked pedicel, its 3 awns equalling the larger glume. — N. W. Wisc. to Dak., and south to Tex. and Mex. — Glumes obscurely if at all papillose along the keel, the middle lobe of the flowering one 2-cleft at the tip. Sterile flowers often 2, the second mostly a large awnless scale, becoming hood-like and coriaceous.

2. **B. hirsùta,** Lag. Tufted (8 – 20′ high), perennial; *leaves flat, lance-linear,* papillose-hairy or glabrous; spikes 1 – 4; *upper empty glume hispid* with strong bristles *from dark warty glands; flowering glume pubescent,* 3-cleft into awl-pointed lobes; *sterile flower and its pedicel glabrous, the 3 awns longer than the glumes* and fertile flower. — Sandy plains, Ill., Wisc., Minn., and southwestward to Mex.

§ 2. ATHEROPÒGON. *Spikes short, numerous in a long and virgate one-sided spike or raceme, spreading or reflexed, each of few* (4 – 12) *spikelets; sterile flowers neutral, rudimentary.*

3. **B. racemòsa,** Lag. (Pl. 9, fig. 1, 2.) Culms tufted from perennial rootstocks (1 – 3° high); sheaths often hairy; leaves narrow; spikes ½′ or less in length, nearly sessile, 20 – 60 in number in a loose general spike (8 – 15′ long); flowers scabrous; glume of the fertile with 3 short awl-pointed teeth; sterile flower reduced to a single small awn, or mostly to 3 awns shorter than the fertile flower, and 1 or 2 small or minute scales. (B. curtipendula, *Gray.*) — Dry hills and plains, southern N. Y. to Minn., and south to Tex. and Mex. July – Sept. — Passes by transitions into var. ARISTÒSA, with spikes shorter; sterile flower of a large saccate glume, awned at the 2-cleft tip and from the lateral nerves, the middle awn exserted, and with a rudiment of a palet. — Ill. (*Geyer*), and southward.

## 47. ELEUSÌNE, Gaertn. Crab-Grass. Yard-Grass. (Pl. 9.)

Spikelets 2 – 6-flowered, with a terminal imperfect flower or naked rudiment, closely imbricate-spiked on one side of a flattish rhachis; the spikes digitate. Glumes membranaceous, shorter than the flowers; flowering glume and palet awnless, the glume ovate, keeled, larger than the palet. Stamens 3. Pericarp (utricle) containing a loose wrinkled seed. — Low annuals, with flat leaves, and flowers much as in Poa. (Name from ’Ελευσίν, the town where Ceres, the goddess of harvests, was worshipped.)

**E.** Índica, Gaertn. (Dog's-tail or Wire Grass.) (Pl. 9, fig. 1 – 6.) Culms ascending, flattened; spikes 2 – 5 (about 2′ long, greenish); glumes pointless; terminal flower a mere rudiment. — Yards, etc., chiefly southward. (Nat. from Ind.?)

**E.** Ægyptìaca, Pers. (Pl. 9, fig. 1 – 4, as Dactyloctenium.) Culms often creeping at base; leaves ciliate at base; spikes 4 – 5; lower glume awned and the flowering one pointed. (Dactyloctenium Ægyptiacum, *Willd.*) — Cultivated fields and yards, Va., Ill., and southward. (Adv. from Afr.?)

## 48. LEPTÓCHLOA, Beauv. (Pl. 15.)

Spikelets 3 – many-flowered (the uppermost flower imperfect), loosely spiked on one side of a long filiform rhachis; the spikes racemed. Glumes membranaceous, keeled, rarely awned, nearly equal; flowering glume 3-nerved sometimes simply awned, larger than the palet. Stamens 2 or 3. Seed closely enclosed. — Ours annuals. Leaves flat. (Name composed of λεπτός, *slender*, and χλόα, *grass*, from the long attenuated spikes.)

1. **L. mucronàta,** Kunth. Sheaths hairy; spikes numerous (20 – 40, 2 – 4′ in length), in a long panicle-like raceme; spikelets small; glumes more or less mucronate, nearly equalling or exceeding the 3 – 4 awnless flowers. — Fields, Va. to Ill., Mo., and southward. Aug.

## 49. BÙCHLOË, Engelm. Buffalo Grass. (Pl. 15.)

Spikelets diœcious (rarely monœcious), very unlike; the staminate 2 – 3-flowered, sessile in 2 rows in short 1-sided spikes, the empty glumes blunt, 1-nerved, very unequal, the flowering larger, 3-nerved, a little exceeding the 2-nerved palet; fertile spikelets 1-flowered, in a contracted, capitate, 1-sided spike, the large outer glumes indurated, 3-fid at the apex, united at base and resembling an involucre, the inner (lower) much smaller and membranaceous, or in the lowest spikelet resembling the outer; flowering glume narrow, hyaline, bifid or nearly entire, enclosing the 2-nerved palet. Styles distinct. Grain ovate, free. — A perennial, creeping or stoloniferous, with narrow flat leaves; staminate spikes (2 – 3) in a pedunculate spike, the pistillate pair sessile in the broad sheaths of the upper leaves. (Name a contraction of *Bubalochloë*, from βούβαλος, *buffalo*, and χλόη, *grass*.)

1. **B. dactyloìdes,** Engelm. Low (3 – 8′ high) and broadly tufted; sterile spikes 3 – 6″ long, the fertile heads 3″ long. — Plains of the Sask. to Minn., Kan., and Tex. One of the most valuable grasses of the plains.

## 50. TRIÒDIA, R. Br. (Pl. 10.)

Spikelets 3 – 12-flowered, somewhat terete, the rhachis with bearded joints; terminal flower abortive. Empty glumes unequal; flowering glumes membranaceous or somewhat chartaceous, much larger than the 2-toothed palet, convex, 2 – 3-toothed or cleft at the apex, conspicuously hairy-bearded or villous on the 3 strong nerves, of which the lateral are marginal or nearly so and usually excurrent, as is the mid-nerve especially, into a short cusp or awn. Stamens 3. Stigmas dark purple, plumose. Grain oblong, nearly gibbous. — Leaves taper-pointed; sheaths bearded at the throat. Panicle simple or compound; the spikelets often racemose, purplish. (Name from τρι-, *three*, and ὀδούς, *a tooth*, alluding to the flowering glume.)

§ 1. TRIODIA proper. *Glumes shorter than the crowded flowers, the flowering one 3-cuspidate by the projection of the nerves, and usually with intermediate membranaceous teeth: palet naked.*

1. **T. cùprea,** Jacq. (Tall Red-top.) Perennial; culm upright (3 – 5° high), very smooth, as are the flat leaves; panicle large and compound, the rigid capillary branches spreading, naked below; spikelets very numerous, 5 – 7-flowered, shining, purple (4″ long); the flowering glumes hairy toward the base, their points almost equal, scarcely exceeding the intermediate teeth, thus appearing 5-toothed. (Tricuspis seslerioides, *Torr.*) — Dry or sandy fields, southern N. Y. to Mo., and southward. Aug. — A showy grass, with the spreading panicle sometimes 1° wide.

§ 2. TRIPLÀSIS. *Glumes much shorter than the somewhat remote flowers; flowering glume and palet strongly fringe-bearded, the glume 2-cleft at the summit, its mid-nerve produced into an awn between the truncate or awn-pointed divisions.*

2. **T. purpùrea,** Hack. (Sand-Grass.) Culms many in a tuft from the same annual root, ascending (6 – 12′ high), with numerous bearded joints; leaves involute-awl shaped, mostly short; panicles very simple, bearing few 2 – 5-flowered spikelets, the terminal one usually exserted, the axillary ones included in the commonly hairy sheaths; *awn much shorter than the glume, seldom exceeding its eroded-truncate or obtuse lateral lobes.* (Tricuspis purpurea, *Gray.*) — In sand, Mass. to Va. along the coast, and southward; also L. Erie, near Buffalo, and Ill. Aug., Sept. — Plant acid to the taste.

### 51. DIPLÁCHNE, Beauv. (Pl. 9.)

Spikelets several-flowered, narrow, erect and scattered along the slender rhachis of the long spicate spikes; flowers all perfect or the uppermost staminate. Empty glumes membranaceous, carinate, acute, unequal; flowering glume slightly longer, 1 – 3-nerved, 2-toothed, and mucronate or shortly awned between the teeth. Stamens 3. Styles distinct. Grain free. — Coarse grasses, with narrow flat leaves, and several or many slender spikes sessile upon an elongated peduncle. (Name from διπλόος, *double,* and ἄχνη, in the sense of *chaff,* with reference to the 2-lobed glume.)

1. **D. fasciculàris,** Beauv. Smooth; leaves longer than the geniculate-decumbent and branching culms, the upper sheathing the base of the panicle-like spike, which is composed of many strict spikes (3 – 5′ long); spikelets slightly pedicelled, 7 – 11-flowered, much longer than the lanceolate glumes; flowers hairy-margined toward the base, the glume with 2 small lateral teeth and a short awn in the cleft of the apex. (Leptochloa fascicularis, *Gray.*) — Brackish meadows, from R. I. southward along the coast, and from Ill. southward on the Mississippi. Aug. – Sept.

### 52. PHRAGMÌTES, Trin. Reed. (Pl. 11.)

Spikelets 3 – 7-flowered; the flowers rather distant, silky-villous at base, and with a conspicuous silky-bearded rhachis, all perfect and 3-androus, except the lowest, which is either neutral or with 1 – 3 stamens, and naked. Glumes membranaceous, shorter than the flowers, lanceolate, keeled, sharp-pointed, very unequal; flowering glume and palet membranaceous, slender, the glume narrowly awl-shaped, thrice the length of the palet. Squamulæ 2, large. Styles long. Grain free. — Tall and stout perennials, with long running rootstocks, numerous broad leaves, and a large terminal panicle. (*Φραγμίτες, growing in hedges,* which this aquatic grass does not.)

1. **P. commùnis,** Trin. Panicle loose, nodding; spikelets 3 – 5-flowered; flowers equalling the beard. — Edges of ponds. Sept. — Looks like Broom-Corn at a distance, 5 – 12° high; leaves 2′ wide. (Eu.)

### 53. ARÚNDO, L.

Flowers all perfect; flowering glume bifid, short-awned between the teeth. Otherwise as Phragmites. (The Latin name of the species.)

**A. Dònax**, L. Very tall (10 – 18°); spikelets 3 – 4-flowered. — Closely resembling Phragmites communis. Cultivated for ornament, and naturalized in Bedford Co., Va. (*A. H. Curtiss.*) (Nat. from Eu.)

### 54. MÚNROA, Torr. (Pl. 15.)

Spikelets usually 3-flowered, few (2 – 4) and nearly sessile in the axils of floral leaves; flowers perfect, or the uppermost abortive. Empty glumes lanceolate, acute, hyaline and 1-nerved; flowering glumes larger, 3-nerved, rather rigid, the mid-nerve stout, excurrent, the lateral ones scarcely so. — Low or prostrate many-stemmed annuals, fasciculately branched, with crowded short flat rigid or pungent leaves, the short sheaths strongly striate. (Named for the English agrostologist, Maj.-Gen. *William Munro.*)

1. **M. squarròsa,** Torr. Glaucous, somewhat pubescent and villous at the nodes or glabrous; leaves 3 – 12″ long. — Dry plains, central Kan. to Dak., west to Mont., Utah, and New Mex.

### 55. KŒLÈRIA, Pers. (Pl. 10.)

Spikelets 3 – 7-flowered, crowded in a dense and narrow spike-like panicle. Glumes membranaceous, compressed-keeled, obscurely 3-nerved, barely acute, or the flowering glume often mucronate or bristle-pointed; the empty ones moderately unequal, nearly as long as the spikelet. Stamens 3. Grain free. — Tufted with simple upright culms, the sheaths often downy; allied to Dactylis and Poa. (Named for Prof. *G. L. Koeler*, an early writer on Grasses.)

1. **K. cristàta,** Pers. Culms 1 – 2° high; leaves flat, the lower sparingly hairy or ciliate; panicle narrowly spiked, interrupted or lobed at base; spikelets 2 – 4-flowered; flowering glume acute or mucronate. — Var. GRÁCILIS, Gray, with a long and narrow spike, the flowers usually barely acute. — Dry hills, Penn. to Ill. and Kan., thence north and westward. (Eu.)

### 56. EATÒNIA, Raf. (Pl. 10.)

Spikelets usually 2-flowered, with an abortive rudiment or pedicel, numerous, in a contracted or slender panicle, very smooth. Empty glumes somewhat equal in length, but very dissimilar, a little shorter than the flowers; the lower narrowly linear, keeled, 1-nerved; the upper broadly obovate, folded round the flowers, 3-nerved on the back, not keeled, scarious-margined. Flowering glume oblong, obtuse, compressed-boat-shaped, naked, chartaceous; the palet very thin and hyaline. Stamens 3. Grain linear-oblong, not grooved. — Perennial, tall and slender grasses, with simple tufted culms, and often sparsely downy sheaths, flat lower leaves, and small greenish (rarely purplish) spikelets. (Named for Prof. *Amos Eaton*, author of a popular Manual of the Botany of the United States, which was for a long time the only general work available for students in this country, and of other popular treatises.)

* *Upper empty glume rounded-obovate and very obtuse; panicle usually dense.*

1. **E. obtusàta,** Gray. (Pl. 10.) Panicle dense and contracted, somewhat interrupted, rarely slender; the spikelets crowded on the short erect branches; upper glume rough on the back; flowers lance-oblong. — Dry soil, N. Penn. to Fla., Mich., and far westward. June, July.

* * *Glume narrower, sometimes acutish; panicle more loose and slender.*

2. **E. Pennsylvánica,** Gray. Leaves mostly 3 – 6′ long; panicle long and slender, loose, the racemose branches lax and somewhat elongated; glumes thin and broadly scarious, the lowest half the length of the flower, very narrow, the upper obtuse or bluntly somewhat pointed; the 2 (rarely 3) flowers lanceolate, with pointed glumes. — Varies, with a fuller panicle, 6 – 8′ long, with the aspect of Cinna (var. MÀJOR, *Torr.*); and, rarely, with the lower palet minutely mucronate-pointed! — Moist woods and meadows; common.

3. **E. Dudlèyi,** Vasey. Culms very slender; leaves shorter, 1 – 2′ long; panicle very slender, the branches few, short and mostly appressed; empty glumes nearly equal, the lower oblong, the upper broadly elliptical, apiculate; flowering glumes shorter than in n. 2, acutish. — Long Island to central N. Y., south to S. C.

## 57. ERAGRÓSTIS, Beauv. (Pl. 10.)

Spikelets 2 – 70-flowered, nearly as in Poa, except that the flowering glume is but 3- (rarely 1-) nerved, not webby-haired at the base, and is deciduous; palet persistent on the rhachis after the rest of the flower has fallen. — Culms often branching. Leaves linear, frequently involute, and the ligule or throat of the sheath bearded with long villous hairs. Panicle various. (Name from *ἦρ, spring*, and *ἄγροστις, a grass.*)

* *Prostrate and creeping, much branched; root annual; spikelets flat, imperfectly diœcious, clustered, almost sessile, in the more fertile plant almost capitate.*

1. **E. réptans,** Nees. Spikelets linear-lanceolate, 10 – 30-flowered; flowers lance-ovate, acute; leaves short, almost awl-shaped. — Gravelly river-borders; common. Aug. — Flowering branches 2 – 5′ high.

* * *Diffusely spreading, or the flowering culms ascending, low* (6 – 15′ *high*), *annual; spikelets often large, flat, forming a narrow crowded panicle.*

**E.** MÌNOR, Host. Sheaths often hairy; leaves flat, smooth; spikelets short-pedicelled, lance- or oblong-linear, 8 – 20-flowered, lead-colored (2 – 5″ long); flowers ovate, obtuse, the lateral nerves becoming evident, and keel smooth. (E. poæoides, *Beauv.*) — Sandy waste places, eastward; rare. (Nat. from Eu.)

**E.** MÀJOR, Host. Sheaths mostly glabrous; spikelets larger (3 – 10″ long), becoming linear, whitish when old, 10 – 50-flowered; flowers more spreading, their glumes larger, with very strong lateral nerves and rough on the keel. (E. poæoides, var. megastachya, *Gray.*) — Similar situations, and more common. Aug. — Emits a sharp, unpleasant odor. (Nat. from Eu.)

* * * *Erect, or in group* ⊢ *diffusely spreading and ascending; panicle open, its branches capillary; spikelets proportionally small, sometimes minute.* (*Number of flowers in the spikelet very variable, according to age, etc.*)

⊢ *Annual; culms slender, branching and decumbent or spreading at base; leaves narrow, flat, soft; branches of the narrow panicle rather short and thickly-flowered, not bearded in the axils, or sometimes the lowest sparingly.*

**E.** PILÒSA, Beauv. (Pl. 10, fig. 1 – 4.) Panicle elongated-oblong, with rather erect branches (except at flowering-time); *spikelets* 5 – 12-flowered (2 – 4″ long, purplish-lead-color), becoming linear, *about equalling their pedicels; empty glumes* (small) *and flowering ones obtuse*, the latter broadly ovate, 1-*nerved* (lateral nerves obsolete). — Sandy or gravelly waste places, S. New Eng. to Ill., and southward. Aug. — Plant 6 – 12′ high. (Nat. from Eu.)

2. **E. Fránkii,** Meyer. Much branched and diffuse (3 – 8′ high); panicle ovate-oblong, rather dense, spreading; *spikelets* 2 – 5-*flowered* (1 – 1½″ long), *on slender pedicels; glumes very acute; the flowering one ovate, acute*, rather obscurely 3-*nerved.* — Low or sandy ground, S. Penn. to Kan., and southwestward. Aug.

3. **E. Púrshii,** Schrader. Sparingly branched at the decumbent base, then erect (½ – 2° high); panicle elongated, the branches widely spreading, very loose; *spikelets* 5 – 18-*flowered*, oblong-lanceolate, at length linear (2 – 4½″ long), *mostly much shorter than their capillary pedicels; glumes all ovate and acute, or the flowering ones acutish,* 3-*nerved.* — Sandy or sterile open grounds, Penn. to Mo., and southwestward; also introduced northward.

+ + *Culms simple, or branching only at the very base, firm, erect, mostly forming thick tufts; leaves very long; panicle very large, compound, often longer than the culm, with elongated loosely-flowered branches, their axils often bearded.* (*Doubtful perennials, or* n. 5 *annual.*)

4. **E. ténuis,** Gray. *Panicle virgately elongated* (1 – 2½° long), very loose, the spreading branches bearded in some of the lower axils, their remote divisions and long *diverging pedicels* capillary; spikelets 2 – 6- (sometimes 7 – 12-) flowered, pale or greenish; *lower glumes lanceolate or awl-shaped, very acute* (1½ – 2″ long), membranaceous, as are the *oblong-lanceolate acute flowers; flowering glume distinctly* 3-*nerved;* the upper ciliate-scabrous. — Sandy soil, Ohio to Ill., Kan., and southward. Aug. – Oct. — Leaves rather rigid, 1½ – 2° long, glabrous or sparingly hairy; the sheaths hairy or glabrous; the throat strongly bearded; flowers much larger than in the next, fully 1½″ long.

5. **E. capillàris,** Nees. *Panicle widely expanding,* usually much longer than the culm, its spreading branches (mostly naked in the axils) and long *diverging pedicels* capillary; *spikelets rather terete*, very small, 2 – 4-flowered, greenish or purplish; *glumes and flowers ovate, acute* (less than 1″ long); *flowering glume obscurely* 3-*nerved,* scarcely keeled; the palet rough-ciliate. — Sandy dry soil and fields; common, especially southward. Aug., Sept. — Leaves and sheaths very hairy, or nearly glabrous; the former about 1° long, not rigid; panicle 1 – 2° long, soon diffuse.

6. **E. pectinàcea,** Gray. *Panicle widely diffuse*, its rigid divergent main branches *bearded in the axils; the capillary pedicels more or less appressed* on the secondary branches; *spikelets flat,* 5 – 15-flowered, becoming linear, purple or purplish; glumes and flowers ovate or oblong-ovate, acutish; *flowering glume strongly* 3-*nerved; palet hirsute-ciliate.* — Leaves long, rigid, mostly hairy, the sheaths especially so; plant 1 – 3° high; spikelets 2 – 3″ long, 1″ wide, closely flowered. — Var. SPECTÁBILIS, Gray. Leaves and sheaths mostly glabrous; branches of the panicle (the lower reflexed with age) and pedicels shorter; spikelets rather larger. — Sandy dry ground, from E. Mass. near the coast, and from Ohio and Ill., southward. Aug. – Oct.

7. **E. campéstris,** Trin. Glabrous or the sheaths villous at the throat; culm short, bearing an elongated and very open panicle with divaricate branches bearded at base; *spikelets* linear, flat, 8 – 12-flowered, *sessile or nearly so* along the branchlets; *glumes very acute or acuminate,* 3-nerved, roughish on the keel; palet minutely ciliate. (E. pectinacea, var. refracta, *Chapm.* Poa refracta, *Ell.*) — Del. and Md. to Fla. and Ala.

### 58. MÉLICA, L. Melic-Grass. (Pl. 10.)

Spikelets 2 – 8-flowered; the 1 – 3 upper flowers imperfect and dissimilar, convolute around each other, and enwrapped by the upper fertile flower. Empty glumes usually large, scarious-margined, convex, obtuse; the upper 7 – 9-nerved. Flowering glume papery-membranaceous, dry and sometimes indurating with age, rounded or flattish on the back, 5 – many-nerved, scarious at the entire blunt summit. Stamens 3. — Perennials with soft flat leaves. Panicle simple or sparingly branched; the rather large spikelets racemose-one-sided. (An old Italian name for Sorghum, from *mel*, honey.)

1. **M. mùtica,** Walt. (Pl. 10.) Slender, with usually narrow leaves, the panicle often reduced to a simple raceme; lower glumes nearly equal and almost equalling the spikelet; fertile flowers usually 2; flowering glumes broad, smooth, obtuse. — Rich soil, Penn. to Fla., west to Wisc., Iowa, and Tex.

2. **M. diffùsa,** Pursh. Taller, $2\frac{1}{2}$ – 4° high, with mostly broader leaves and a more usually compound and many-flowered panicle; lower glumes more unequal, the outer very broad; fertile flowers usually 3; flowering glumes somewhat scabrous and more acute. (M. mutica, var. diffusa, *Gray*.) — Penn. to Ill., and southward.

### 59. DIARRHÈNA, Raf. (Pl. 10.)

Spikelets several-flowered, smooth and shining, one or two of the uppermost flowers sterile. Empty glumes ovate, much shorter than the flowers, coriaceous; the lower much smaller; flowering glume ovate, convex on the back, rigidly coriaceous, its 3 nerves terminating in a strong and abrupt cuspidate or awl-shaped tip. Squamulæ ovate, ciliate. Stamens 2. Grain very large, obliquely ovoid, obtusely pointed, rather longer than the glume, the cartilaginous shining pericarp not adherent to the seed. — A nearly smooth perennial, with running rootstocks, producing simple culms (2 – 3° high) with long linear-lanceolate flat leaves toward the base, naked above, bearing a few short-pedicelled spikelets (2 – 3″ long) in a very simple panicle. (Name composed of δίς, *two*, and ἄῤῥην, *man*, from the two stamens.)

1. **D. Americàna,** Beauv. Shaded river-banks and woods, Ohio to Ill., and southward. Aug.

### 60. UNÌOLA, L. Spike-Grass. (Pl. 11.)

Spikelets closely many-flowered, very flat and 2-edged; 3 – 6 of the lowest glumes empty, lanceolate, compressed-keeled; flowering glume coriaceo membranaceous, strongly laterally compressed and keeled, striate-nerved, usually acute or pointed, entire, enclosing the much smaller compressed 2-keeled palet and the free laterally flattened smooth grain. Stamen 1 (or in U. paniculata 3). — Upright smooth perennials, growing in tufts from strong creeping rootstocks, with broad leaves and large spikelets in an open or spiked panicle. (Ancient name of some plant, a diminutive of *unio*, unity.)

* *Spikelets large* ($\frac{1}{2}$ – 2′ *long*), *ovate or oblong*, 9 – 30-*flowered; panicle open.*

1. **U. paniculàta,** L. (Sea Oats.) Culm and panicle elongated (4 – 8° high); *leaves narrow*, when dry convolute; *spikelets ovate, short-pedicelled;* glumes glabrous, bluntish, several of the lower sterile; stamens 3. — Sand-hills on the sea shore, S. Va. and southward.

2. **U. latifòlia,** Michx. (Pl. 11, fig. 1–3) Culm 2–4° high; panicle loose; *leaves broad* and flat (nearly 1′ wide); *spikelets* at length *oblong, hanging on long pedicels;* glumes acute, ciliate on the keel, all but the lowest with perfect monandrous flowers. — Shaded slopes, S. Penn. to Ill., and southward.

* * *Spikelets small; panicle contracted, wand-like: perfect flowers long-pointed.*

3. **U. grácilis,** Michx. Culm 3° high, slender; *spikelets short-pedicelled* (2–3″ long), broadly wedge-shaped, acute at base, 4–8-*flowered;* glumes ovate and divergently beaked, long, the 3 lowest empty. — Sandy soil, from Long Island to Va., near the coast, and southward. Aug.

## 61. DISTÍCHLIS, Raf. Spike-Grass. (Pl. 10.)

Spikelets and numerous flowers compressed, crowded in a densely spiked or capitate panicle. Glumes herbaceous or membranaceous, the lower faintly many-nerved; flowering glumes rather coriaceous, laterally much flattened, faintly many-nerved, acute. Ovary stalked. — Flowers diœcious, rather large. Leaves crowded, involute, usually rigid. (Name from δίστιχος, *two-ranked.*)

1. **D. marítima,** Raf. Culms tufted from creeping rootstocks (9–18′ high); spike oblong, flattened (1′ long); spikelets ovate or oblong, 5–10-flowered; glumes smooth and naked; grain pointed. (Brizopyrum spicatum, *Hook.*) — Salt marshes and shores. Aug. — Glumes of the pistillate flowers more rigid and almost keeled; stigmas very long, plumose; the staminate glumes smaller and somewhat rounded on the back.

## 62. DÁCTYLIS, L. Orchard Grass. (Pl. 10.)

Spikelets several flowered, crowded in one-sided clusters, forming a branching dense panicle. Glumes all herbaceous, keeled, awn-pointed, rough-ciliate on the keel; the flowering one 5-nerved, the upper most commonly smaller and thinner. Stamens 3. Grain lance-oblong, acute, free. — Stout tufted perennial; leaves keeled. (*Dactylos*, a name in Pliny for a grass with digitate spikes, from δάκτυλος, *a finger.*)

**D.** GLOMERÀTA, L. Rough, rather glaucous (3° high); leaves broadly linear; branches of the panicle naked at base; spikelets 3–4-flowered. — Fields and yards, especially in shade. June. (Nat. from Eu.)

## 63. BRÌZA, L. Quaking Grass. (Pl. 10.)

Spikelets many-flowered, ovate or heart-shaped, flattish-tumid; the flowers closely imbricated. Glumes roundish, unequal, purplish, very concave or ventricose, 3–5-nerved; the flowering ventricose on the back, heart-shaped at the base, papery-membranaceous and becoming dry, scarious-margined, obscurely many-nerved; the palet much smaller, ovate, flat. Stamens 3. Stigmas branched-plumose. Grain flattened parallel with the glumes, adhering to the palet. — Leaves flat; panicle loose, diffuse, with large showy spikelets often drooping on delicate pedicels. (Βρίζα, the Greek name of a kind of grain.)

**B.** MÈDIA, L. Panicle erect, the branches spreading; spikelets 5–9-flowered (3″ long); lower glumes shorter than the first flowering one; root perennial. — Pastures; sparingly eastward. June. (Adv. from Eu.)

## 64. PÒA, L. Meadow-Grass. Spear-Grass. (Pl. 10.)

Spikelets ovate or lance-ovate, laterally compressed, several- (2–10-) flowered, in an open panicle. Empty glumes mostly shorter than the flowers, the lower smaller; flowering glume membranaceo-herbaceous, with a delicate scarious margin, compressed-keeled, pointless, 5-nerved (the intermediate nerves more obscure or obsolete), the principal nerves commonly clothed with soft hairs at and toward the often cobwebby base; palet membranaceous, 2-toothed. Stamens 2 or 3. Stigmas simply plumose. Grain oblong, free. — Culms tufted, from perennial roots, except n. 1. Leaves smooth, usually flat and soft. (Πόα, an ancient Greek name for grass or fodder.)

* *Low and spreading* (3 – 6′ *high*) *from an annual or biennial root, flaccid; branches of the short panicle single or in pairs.*

**P.** ÁNNUA, L. (LOW SPEAR-GRASS.) Culms flattened; panicle often 1-sided, usually short and pyramidal, sometimes more slender (P. cristata, *Chapm.*); spikelets crowded, very short-pedicelled, 3 – 7-flowered. — Cultivated and waste grounds, everywhere. April – Oct. (Nat. from Eu.)

* * *Low; the culms* (6 – 20′ *long*) *geniculate-ascending from a running rootstock, rigid, very much flattened; panicle simple and contracted.*

**P.** COMPRÉSSA, L. (WIRE-GRASS. ENGLISH BLUE-GRASS.) (Pl. 10, fig. 1 – 4.) Pale, as if glaucous; leaves short; panicle dense and narrow, somewhat one-sided (1 – 3′ long), the short branches mostly in pairs; spikelets almost sessile, 3 – 10-flowered, flat. — Dry, mostly sterile soil, in waste places; rarely in woods. (Nat. from Eu.)

* * * *Low alpine or alpestrine species, erect, in perennial tufts.*

+ *Soft and flaccid, smooth or nearly so, even to the branches of the panicle; leaves short and flat, short-pointed; ligule elongated.*

1. **P. alpina,** L. Culms rather stout (8 – 14′ high); *leaves broadly linear,* especially those of the culm (1½ – 2′ long, 1½ – 3″ wide); *panicle short and broad;* spikelets broadly ovate, 3 – 9-flowered (about 3″ long); flowering glume villous on the midrib and margins. — N. Maine (?), Isle Royale and north shore of Lake Superior, and northward. (Eu.)

2. **P. láxa,** Haenke. Culms slender (4 – 9′ high); *leaves narrow; panicle somewhat raceme-like, narrow,* often one-sided and nodding; spikelets 2 – 4-flowered, one half smaller. — Alpine mountain-tops of Maine, N. H., and N. New York, and high northward. (Eu.)

+ + *More strict and rigid, roughish, especially the panicle; ligule short.*

3. **P. nemoràlis,** L. Culms 6 – 20′ high; leaves narrow, short, soon involute; branches of the panicle 2 – 5 together, very scabrous; spikelets purplish (or sometimes pale), 2 – 5-flowered; lower *glumes ovate-lanceolate and taper-pointed,* the flowering lanceolate, somewhat webby at base, villous on the keel and margins below the middle, its nerves obscure. (P. cæsia, *Smith.*) — The more common form has a usually narrow somewhat nodding panicle, with short ascending branches, the small pale or purplish spikelets 2-flowered. Lab. to N. Maine and N. Vt.; Lake Champlain (*Pringle*); N. shore of L. Superior to N. Iowa, and westward. — A form with somewhat stouter and stricter habit, the darker or often pale spikelets 3 – 5-flowered (P. cæsia, var. strictior, *Gray*), corresponds nearly to the European P. cæsia. High mountains of N. H. and Vt., and Gardner's Island, L. Champlain (*C. E. Faxon*), Isle Royale and N. shore of L. Superior, and westward. — Also a form with the branches of the short panicle broadly divaricate; N. Wisc. (*Lapham*). (Eu.)

* * * * *Taller (1 – 3°) meadow or woodland grasses; panicle open.*

+- *Spikelets mostly very numerous and crowded on the rather short rough branches (usually in fives) of the oblong or pyramidal panicle, green, or sometimes violet-tinged; flowers acute, crowded, more or less webbed at base.*

4. **P. serótina,** Ehrhart. (FALSE RED-TOP. FOWL MEADOW-GRASS.) Culms tufted without running rootstocks; leaves narrowly linear, soft and smooth; *ligules elongated; spikelets* 2 – 4- (rarely 5-) flowered (1 – 2″ long), *all short-pedicelled* in an elongated panicle, often tinged with dull purple; flowers and glumes narrow; *flowering glume very obscurely nerved.* — Wet meadows and low banks of streams; common, especially northward. July, Aug. — A good grass for moist meadows. (Eu.)

5. **P. praténsis,** L. (JUNE GRASS. SPEAR GRASS. KENTUCKY BLUE-GRASS.) Culms sending off copious *running rootstocks* from the base, and the *sheaths smooth; ligule short and blunt;* panicle short-pyramidal; *spikelets* 3 – 5-flowered, *crowded,* and mostly *almost sessile* on the branches, ovate-lanceolate or ovate; *flowering glume* 5-*nerved, hairy on the margins* as well as keel. — Common in dry soil; imported for pastures and meadows. Indigenous in mountain regions from N. Penn. to New Eng., and northward. May – July. (Eu.)

**P.** TRIVIÀLIS, L. (ROUGHISH MEADOW-GRASS.) Culms erect from a somewhat decumbent base, but no distinct running rootstocks; *sheaths and leaves more or less rough; ligule oblong, acute;* panicle longer or with the branches more distant; spikelets mostly 3-flowered, broader upward; *flowering glume prominently* 5-*nerved, naked at the margins:* otherwise nearly as in the preceding. — Moist meadows, etc. July. (Nat. from Eu.)

+- +- *Spikelets fewer and more scattered, on slender pedicels; plants soft and smooth, flowering early. (No running rootstocks, except in* n. 10.)

++ *Spikelets small* (1 – 2″ *long*), *pale green, rather loosely* 2 – 4-*flowered; flowers oblong, obtuse; flowering glume scarcely scarious-tipped; culm-leaves lance-linear, acute,* 1 – 3′ *long.*

6. **P. sylvéstris,** Gray. *Culm flattish,* erect; branches of the oblong-pyramidal panicle short, numerous, in fives or more; *flowering glumes villous on the keel its whole length, and on the margins below the middle,* sparingly webbed at base. — Rocky woods and meadows, western N. Y. to Wisc., Kan., and southward. June.

7. **P. débilis,** Torr. *Culms terete,* weak; branches of the small panicle few and slender (the lower 1½ – 2′ long to the few spikelets), in pairs and threes; *flowers very obtuse, smooth and glabrous,* except a sparing web at base. — Rocky woodlands, R. I. to Penn. and Wisc. May.

++ ++ *Spikelets* 2″ *long, light green; oblong-lanceolate flowers and glumes acute.*

8. **P. alsòdes,** Gray. Leaves rather narrowly linear, acute, the uppermost (2½ – 4′ long) often sheathing the base of the narrow and loose panicle, the capillary branches appressed when young, mostly in threes or fours; flowering glume very obscurely nerved, villous on the keel below, and with a narrow cobwebby tuft at base, otherwise glabrous. — Woods, on hillsides, N. Eng. to Penn. and Va., west to Wisc. May, June.

++ ++ ++ *Spikelets larger* (3 – 4″ *long*). *pale green, rarely purple-tinged, few and scattered at the ends of the long capillary branches (mostly in pairs or threes) of the very diffuse panicle; flowers* 3 – 6, *loose, oblong and obtuse, as* *is the larger glume; flowering glume conspicuously scarious at the apex, villous below the middle on the keel and margins; culms flattish, smooth.*

9. **P. flexuòsa,** Muhl. (not of Wahl.) Culms 1–3° high, tufted, its *leaves all linear* (2–5′ *long*), *gradually taper-pointed; panicle very effuse* (its branches 2–4′ long to the 4–6-flowered spikelets or first ramification); *flowering glume prominently nerved, no web* at the base. — Dry woods, Penn. and Del. to Ky., and southward. Feb.–May. — Near the last.

10. **P. brevifòlia,** Muhl. Culms 1–1½° high from *running rootstocks*, 2–3-leaved, the *upper leaves very short* (½–2′ *long*), *lanceolate, all abruptly cuspidate-tipped;* branches of the short panicle mostly in pairs; spikelets 3–4-flowered; *flowering glume rather obscurely nerved, cobwebby at base.* — Rocky or hilly woodlands, Penn., Va., and sparingly westward to Ky. and Ill. April, May. — Culm scarcely surpassing the long root-leaves.

## 65. GRAPHÉPHORUM, Desv. (Pl. 10.)

Spikelets 2–4-flowered, compressed, the rhachis pilose on one side, jointed, produced above the flowers into a hairy pedicel. Empty glumes thin-membranaceous, acute, carinate, mostly nearly equalling the remote flowers; flowering glume thin and membranaceous or scarious, convex, scarcely keeled, faintly nerved, entire, pointless and awnless. Stamens 3. Stigmas plumose. Ovary glabrous. — Perennial, with linear flat leaves, their sheaths closed at base, the spikelets in a loose panicle. (Named from γραφίς, *a pencil*, and φέρω, *to bear*, from the terminal hairy pedicel.)

1. **G. melicoídeum,** Desv. Culm 1–2° high; leaves roughish; panicle open; glumes unequal, lanceolate, their midrib and the pedicels rough. — N. Maine, N. Vt., Upper Mich., and northward; rare. — Var. MÀJUS, Gray, is a luxuriant form, 2–3° high, with ampler panicle; borders of a swamp, Macomb Co., Mich. Aug.

## 66. SCOLÓCHLOA, Link. (Pl. 15.)

Spikelets 2-4-flowered, subterete. Rhachis hairy at the base of the flowers, ending in a naked pedicel. Empty glumes concave, membranaceous, unequal, the outer 3-nerved, acute, the inner 5-nerved, toothed at the apex, nearly equalling the flowers; flowering glume more rigid, prominently 7-nerved, toothed at the apex; nerves all parallel. Stamens 3. Stigmas plumose. Ovary hairy. — Tall perennials, growing in water, with loosely sheathing leaves, and spikelets in a lax panicle. (Name probably from σκῶλος, *a prickle*, and χλόα, *grass*.)

1. **S. festucàcea,** Link. Stout, 3–4° high, smooth; leaves rough on the margins; panicle suberect; spikelets 3–4″ long. (Festuca borealis, *Hook.*) — Emmet Co., Iowa (*Cratty*), and northward.

## 67. GLYCÈRIA, R. Br. MANNA-GRASS. (Pl. 10.)

Spikelets terete or flattish, several–many-flowered; the flowers mostly early deciduous by the breaking up of the rhachis into joints, leaving the short and unequal 1–3-nerved membranaceous lower glumes behind. Flowering glume and palet naked, of a rather firm texture, nearly equal; the glume rounded on the back, scarious (and sometimes obscurely toothed) at the blunt or rarely acute summit, glabrous, prominently 5 – 7-nerved, the nerves parallel and separate. Squamulæ fleshy and truncate, or none. Stamens commonly 2. Styles present; stigmas compoundly plumose. Ovary smooth. Grain oblong, free, the furrow very narrow or none. — Perennial smooth marsh grasses, mostly with creeping bases or rootstocks; spikelets panicled. (Name from γλυκερός, *sweet*, in allusion to the taste of the grain.)

* *Spikelets ovate, oblong, or linear-oblong,* 1 – 3″ *in length,*

+ *At length nodding in an open panicle, flattish laterally but turgid.*

1. **G. Canadénsis,** Trin. (Rattlesnake-Grass.) Culm stout, 2 – 3° high; leaves long, roughish; panicle oblong-pyramidal, at length drooping; spikelets ovate, at length very broad and tumid, Briza-like, 2″ long, pale, with purplish glumes; flowering glume acute or blunt-pointed, firm, with not very prominent nerves, longer than the rounded palet. — Bogs and wet places; common from Penn. to E. Kan., and northward. July.

+ + *Erect in a narrow contracted panicle, somewhat flattened and turgid.*

2. **G. obtùsa,** Trin. Culm stout, 1 – 2° high, very leafy; leaves long, smooth; *panicle narrowly oblong, dense* (3 – 5′ long); spikelets 3 – 7-flowered, 2 – 3″ long; flowering glume obtuse. — Bogs, E. New Eng. to Penn. and southward, near the coast.

3. **G. elongàta,** Trin. Leaves very long (1° or more), rough; *panicle narrowly racemose, elongated* (1° long), *recurving;* the branches and 3 – 4-flowered spikelets *appressed;* flowering glume obtuse. — Wet woods, N. Eng. to Mich., Minn., and northward; Roan Mt., N. C. (*Scribner*). July – Aug.

+ + + *Diffuse; flower-glume truncate-obtuse, strongly 7-nerved; palet 2-toothed.*

4. **G. nervàta,** Trin. (Fowl Meadow-Grass.) (Pl. 10, fig. 1 – 3.) Culm erect, 1 – 3° high; leaves rather long; branches of the loose *panicle* capillary, *at length drooping, the numerous small spikelets* (1 – 2″ long, commonly purplish) *ovate-oblong,* 3 – 7-flowered. — Moist meadows; common. June.

5. **G. pállida,** Trin. Culms slender, 1 – 3° long, ascending from a creeping base; leaves short, sharp-pointed, pale; *branches of the rather simple panicle slender, erect-spreading,* rough; the *spikelets usually few, somewhat appressed, oblong-linear,* 5 – 9-flowered (pale, 2 – 3″ long); *flowering glume minutely 5-toothed;* the palet lanceolate, conspicuously 2-toothed. — Shallow water; Maine to Va., west to Ky., Ind., and Mich.; common, especially northward. July.

6. **G. grándis,** Watson. (Reed Meadow-Grass.) Culm stout, upright, 3 – 5° high; leaves large (1 – 2° long, $\frac{1}{3}$ – $\frac{1}{2}$′ wide); *panicle much branched, ample* (8 – 15′ long), *the numerous branches ascending, spreading with age; spikelets oblong or linear-oblong,* 3 – 6-flowered (usually purplish, 2 – 3″ long); *flowering glume entire.* (G. aquatica of Amer. authors.) — Wet grounds; N. Eng. to western N. Y., Mich., Minn., and westward.

* * *Spikelets linear* ($\frac{1}{2}$ – 1′ *long*), *pale, appressed on the branches of the long narrow racemose panicle, terete except during anthesis; palets minutely roughish, the upper 2-toothed; squamulæ unilateral or united; ligule long; culm flattened* (1 – 5° *high*), *ascending from a rooting base.* (Glyceria, *R. Br.*)

7. **G. flùitans,** R. Br. Panicle 1° long; the simple branches appressed, finally spreading below; leaves short and rather broad, very smooth; spikelets

7–13-flowered; *flowering glume oblong, obtuse,* or the scarious tip acutish, entire or obscurely 3-lobed, usually rather longer than the blunt palet.—Shallow water; common. June–Aug.

8. **G. acutiflòra,** Torr. Spikelets 5–12-flowered, few and scattered; *flowering glume oblong-lanceolate, acute, shorter than the long tapering point of the palet.*—Wet places, Penn. to Maine; rather rare. June.—Resembles the last; but the erect leaves smaller, the separate flowers twice the length (4″ long), and less nerved.

## 68. PUCCINÉLLIA, Parl. (Pl. 15.)

Characters as in Glyceria, but the flowering glumes inconspicuously or obsoletely 5-nerved; squamulæ thin and distinct; stigmas sessile and simply plumose; grain compressed, often broadly furrowed.—Mostly saline species; perennial. (Named for Prof. *Benedetto Puccinelli,* an Italian botanist.)

1. **P. marítima,** Parl. (Goose-Grass. Sea Spear-Grass.) *Root stoloniferous;* culms erect, 1–1½° high; *leaves involute, acute or pungent;* lower *branches of the narrow panicle often solitary or in pairs, appressed* or more or less spreading; spikelets 3–6″ long, oblong or linear, 4–9-flowered; flowering glumes rounded at the summit, 1¼″ long. (Glyceria maritima, *Wahl.* Atropis maritima, *Griseb.*)—Marshes along the coast; not rare, and somewhat variable in the form of the panicle and size of the glumes. (Eu.)

Var. (?) **minor,** Watson. Culms low and slender, from very slender creeping rootstocks; leaves very narrow and involute; ligule long; panicle short and very narrow; spikelets 2–4-flowered, the flowers 1″ long or less.—Shore of Mt. Desert Island (*E. L. Rand*); Labrador (*J. A. Allen*).—Probably rather a form of the western P. airoides (Poa airoides, *Nutt.*).

2. **P. dístans,** Parl. *Not stoloniferous;* culms rather stout, geniculate below; *leaves mostly flat, short;* ligule short; *lower branches of the panicle in fours or fives,* usually more or less naked at base, soon *spreading* and at length deflexed; spikelets 2–3″ long, 3–6-flowered; flowering glume truncate-obtuse, ½–1″ long. (Glyceria distans, *Wahl.* Atropis distans, *Griseb.*)—Salt marshes along the coast and on ballast; apparently much rarer than the last, and perhaps not native. (Eu.)

## 69. FESTÙCA, L. Fescue-Grass. (Pl. 10.)

Spikelets 3–many-flowered, panicled or racemose; the flowers not webby at base. Lower glumes unequal, mostly keeled. Flowering glumes chartaceous or almost coriaceous, roundish (not keeled) on the back, more or less 3–5-nerved, acute, pointed, or often bristle-awned from the tip, rarely blunt; the palet mostly adhering at maturity to the enclosed grain. Stamens 1–3.—Flowers, and often the leaves, rather dry and harsh. (An ancient Latin name of some kind of grass, of uncertain meaning.)

* *Flowers awl-shaped, bristle-pointed or awned from the tip; panicle contracted.*

+ *Annuals or biennials, slender, 5–18′ high; leaves convolute-bristle-form.*

**F. Myùrus,** L. Panicle spike-like, one-sided; spikelets about 5-flowered; lower glumes very unequal; *awn much longer than the flowering glume,* fully 6″ in length; stamen 1.—Dry fields, Nantucket, Mass., to Del., and southward. July. (Nat. from Eu.)

1. **F. tenélla,** Willd. Panicle spike-like, one-sided, or more compound and open; spikelets 7–13-flowered; *awn 1–3″ long or more, usually shorter than or about equalling the glume;* stamens 2. — Dry sterile soil, especially southward. June, July.

+ + *Perennial, tufted,* 6–24′ *high; stamens* 3.

2. **F. ovìna,** L. (SHEEP'S FESCUE.) Glaucous, ½–2° high; leaves mostly radical, very narrow and convolute; panicle somewhat one-sided, short, usually more or less compound, open in flowering; spikelets 3–8-flowered; awn not more than half the length of the flower, often much shorter or almost wanting. — Indigenous in northern New Eng., about Lake Superior, and northward; naturalized farther south as a pasture grass. June. — Varies greatly. — Var. VIVÍPARA, L. (which with us has running rootstocks), a state with the spikelets partially converted into leafy shoots, is found on the alpine summits of the White Mts., and high northward. — Var. DURIÚSCULA, Koch, is a tall form, with spikelets rather larger, usually in a more compound panicle; culm-leaves often flat or less convolute, and the lower with their sheaths either smooth or hairy. New Eng. to Va., and westward, as a naturalized plant, and indigenous northward. A native form of this variety with a lax panicle, 2–4-flowered spikelets, and slender awns nearly as long as the glume (var. rubra, of last ed.), is found on Keweenaw Peninsula (*Robbins*) and Isle Royale, L. Superior (*Gilman*). (Eu.)

* * *Flowers oblong or lanceolate, awnless or nearly so* (1½–4″ *long*); *grain often free!* (*Root perennial; culms mostly tall; leaves flat.*)

3. **F. nùtans,** Willd. Culm 2–4° high, naked above; leaves broadly linear, taper-pointed, dark green, often rather hairy; *panicle of several long and slender spreading branches,* mostly in pairs, *drooping* when old, rough, naked below, bearing near their extremity a few ovate 3–5-flowered spikelets (3″ long) on pretty long pedicels; *flowers ovate-oblong, rather obtuse, close together,* coriaceous, smooth, very obscurely 5-nerved. — Rocky woods and copses. July. — A common form with the panicle more or less contracted and somewhat erect has been distinguished as F. Shortii.

**F.** ELÀTIOR, L. (TALLER OR MEADOW FESCUE.) (Pl. 10, fig. 1–3.) *Panicle narrow,* contracted before and after flowering, *erect, with short branches;* spikelets crowded, 5–10-flowered; *flowers rather remote, oblong-lanceolate;* flowering glume 5-nerved, scarious-margined, blunt, acute, or rarely with a distinct but very short awn. — The type is large, 3–4° high; spikelets about 6″ long, in an ample and compound panicle. Rich grass-land. — Var. PRATÉNSIS, Gray (F. pratensis, *Huds.*), is lower (1–3° high), with a simpler or close panicle of smaller or narrower spikelets, and abounds in grass-lands. June–Aug. (Nat. from Eu.)

**F.** GIGANTÈA, Vill. Erect, glabrous, 3–4° high; leaves bright green, 3–6″ broad; panicle very loose, nodding; spikelets 3–6-flowered; flowering glumes 3″ long, with a slender awn of twice the length. — Of rare occurrence near the coast. (Nat. from Eu.)

### 70. BRÒMUS, L. BROME-GRASS. (Pl. 10.)

Spikelets 5–many-flowered, panicled. Glumes unequal, membranaceous; the lower 1–5-, the upper 3–9-nerved. Flowering glume either convex on the back or compressed-keeled, 5 – 9-nerved, awned or bristle-pointed from below the mostly 2-cleft tip; palet at length adhering to the groove of the oblong or linear grain. Stamens 3. Styles attached below the apex of the ovary. — Coarse grasses, with large spikelets, at length drooping, on pedicels thickened at the apex. (An ancient name for the Oat, from *βρόμος, food.*)

§ 1. *Flowering glume oblong, turgid, and convex on the back; the flowers imbricated over one another before expansion; lower empty glume distinctly* 3 – 5-*nerved, the upper* 5 – 9-*nerved.*

* *Perennial; indigenous. Lower glume strongly* 3-*nerved, the upper* 5-*nerved.*

1. **B. Kálmii,** Gray. (Wild Chess.) Culm slender (1½ – 3° high); leaves and sheaths conspicuously or sparingly hairy; panicle simple, small (3 – 4′ long); spikelets drooping on capillary peduncles, closely 7 – 12-flowered, densely silky all over; awn only one third the length of the lance-oblong flower; flowering glume 7 – 9-nerved, much longer and larger than the palet. — Dry ground, N. Eng. to Penn., Mo., Minn., and northward. June, July.

* * *Annuals or biennials, introduced into grain-fields, or rarely in waste grounds.*

**B.** secálinus, L. (Cheat or Chess.) (Pl. 10, fig. 1, 2.) *Panicle spreading, even in fruit,* the drooping peduncles little branched; *spikelets oblong-ovate, turgid, smooth,* of 8 – 10 rather distant flowers; glume rather longer than the palet, short-awned or awnless; sheaths nearly glabrous. — Too common in wheat-fields. June, July. (Adv. from Eu.)

**B.** móllis, L. (Soft Chess.) *Whole plant downy; panicle more erect, contracted in fruit; spikelets conical-ovate,* somewhat flattened; flowers closely imbricated; *glume acute,* equalling the awn. — Wheat-fields, N. Y. to Va.; scarce. June. (Adv. from Eu.)

**B.** racemòsus, L. (Upright Chess.) Very similar to the last, but nearly glabrous or the sheaths sometimes hairy; glumes glabrous and shining. (Adv. from Eu.)

§ 2. *Flowering glume somewhat convex, but keeled and laterally more or less compressed, at least above; flowers soon separating from each other; lower empty glume* 1-*nerved, the upper* 3-*nerved, or with an obscure additional pair.*

* *Perennial, tall* (3 – 5° *high*); *flowers oblong or lanceolate.*

2. **B. ciliàtus,** L. Panicle compound, very loose, the elongated branches at length divergent, drooping; spikelets 7 – 12-flowered; flowering glume tipped with an awn ½ – ⅔ its length, silky with appressed hairs near the margins, at least below (or rarely naked), smooth or smoothish on the back; — or, in var. púrgans, Gray, clothed all over with short and fine appressed hairs. — River-banks and moist woodlands; common. July, Aug. — Culm and large leaves (3 – 6″ wide) smooth or somewhat hairy; the sheaths in the larger forms often hairy or densely downy near the top. Variable, comprising several forms.

**B.** ásper, L. Culm slender and panicle smaller; spikelets 5 – 9-flowered; glume linear-lanceolate, scarcely keeled, hairy near the margins, rather longer than the awn; sheaths and lower leaves hairy or downy. — N. Brunswick to Mich. and Ky. (Nat. from Eu.)

* * *Annual or biennial; flowers slender; palet pectinate-ciliate on the nerves.*

**B.** stérilis, L. Culm glabrous; leaves rather downy; panicle open; spikelets on elongated nearly straight simple peduncles, of 5 – 9 rather distant 7-nerved roughish linear-awl-shaped long-awned flowers (awn 1′ long). — Waste places and river-banks, E. Mass. to Penn.; rare. June. (Nat. from Eu.)

**B. tectòrum**, L. Leaves short; panicle lax, somewhat 1-sided, the more numerous pubescent spikelets on very slender curving pedicels. — More common, N. Eng. to Penn. and N. Y. (Adv. from Eu.)

### 71. LÒLIUM, L. Darnel. (Pl. 11.)

Spikelets many-flowered, solitary on each joint of the continuous rhachis, placed edgewise; empty glumes, except in the terminal spikelet, only one (the upper) and external. Otherwise nearly as in Agropyrum. (Ancient Latin name.)

**L. perénne**, L. (Common Darnel, Ray- or Rye-Grass.) Root perennial; *glume shorter than the spikelet; flowers* 8–15, awnless or sometimes short-awned. — Fields and lots; eastward. June. (Nat. from Eu.)

**L. temuléntum**, L. (Bearded Darnel.) Root annual; culm taller; *outer glume fully equalling the* 5–7-flowered *spikelet; awn longer than the flower* (½′ long). — Grain-fields; rare. (Adv. from Eu.)

### 72. AGROPỲRUM, Gaertn. (Pl. 11.)

Spikelets 3–many-flowered, compressed, 2-ranked, alternate on opposite sides of a solitary terminal spike, single at each joint (the lowermost, or all, rarely in pairs) and sessile with the side against the axis. Glumes transverse (i. e. right and left), nearly equal and opposite, lanceolate, herbaceous, nerved. Flowering glumes rigid, convex on the back, 5–7-nerved, pointed or awned from the tip; palet flattened, bristly-ciliate on the nerves, adherent to the groove of the grain. Stamens 3. — Our species rather coarse perennials, of difficult definition. (Name from ἀγρός, *a field*, and πυρός, *wheat.*)

* *Multiplying by long running rootstocks; awn shorter than the flower or none.*

1. **A. rèpens**, Beauv. (Couch-, Quitch-, or Quick-Grass.) *Spikelets* 4–8-*flowered, glabrous* or nearly so; glumes 3–7-nerved; rhachis glabrous, but rough on the edges; awns when present straight; leaves flat and often roughish or pubescent above. (Tríticum repens, *L.*) — Nat. from Europe in cultivated grounds, fields, etc., and very troublesome; indigenous in some of its forms northwestward and on the coast. — Varies greatly. The ordinary form has a narrow spike, with 3–5-flowered spikelets, the glumes merely acute and rigid-cuspidate, or acuminate, or short-awned. A tall form, rather bright green, bears awns nearly as long as the glumes. Other forms abound, especially on or near the coast. A maritime variety, much resembling var. glaucum, *Boiss.* (A. glaucum, *R. & S.*), with large crowded 5–10-flowered spikelets and glumes very blunt or mucronate, glaucous and the leaves rather rigid and pungent, occurs on the coast of Maine (Cape Elizabeth, *Tuckerman*). In the more usual form of this variety, with the large spikes often elongated (3–9′) and the leaves less rigid, the glumes are acuminate or rarely short-awned. The rhachis or the whole inflorescence and the lower sheaths are sometimes very pubescent. The glabrous state, or a very similar glabrous variety, is also abundant in the western region, from Kan. and Neb. to Dak., and westward, where it is known as *Blue-joint* or *Blue-stem.* (Eu.)

2. **A. dasystàchyum**, Vasey. Resembling the last; glaucous; leaves narrow and often involute; the 5–9-flowered *spikelets densely downy-hairy* all over; glumes thinner with scarious margins, mostly long-acuminate. (Triticum dasystachyum, *Gray.*) — Sandy shores of Lake Huron and Superior, and northward. Aug.

* * *No obvious running rootstocks, glabrous, or the flat and roughish leaves sometimes hairy above; glumes as well as flowers mostly awned or awn-pointed.*

3. **A. violàceum,** Lange. *Spike short, dense, strict and rigid,* usually tinged with violet or purple; spikelets 3–5-flowered; *glumes* conspicuously 5-nerved, *rather abruptly narrowed into a cusp or short awn.* (Triticum violaceum, *Hornem.*) — Alpine region of the White Mts., L. Superior, north and westward. (Eu.) — Passing into a variety with longer usually pale narrow spikes and attenuate often long-awned glumes, which sometimes approaches A. caninum. N. Brunswick, White Mts., N. H., Penn. (*Porter*), L. Superior, and westward.

4. **A. canìnum,** R. & S. (Awned Wheat-Grass.) *Spike usually more or less nodding,* at least in fruit, rather dense (3–6′ long); spikelets 3–5-flowered; *glumes* 3–5-*nerved; awns straight or somewhat bent or spreading, fully twice the length of the palet.* (Triticum caninum, *L.*) — Sparingly naturalized in cultivated ground and meadows. Indigenous along our northern borders, and westward. (Eu.)

5. **A. ténerum,** Vasey. Culms 1–3° high; leaves narrow; spike very narrow, 2–7′ long; spikelets 3–5-flowered; glumes short-acuminate. — Minn. to Kan., and very common westward.

## 73. LEPTÙRUS, R. Br.

Spikelets 1–2-flowered, solitary and alternate upon the opposite sides of a narrow spike, sessile and appressed in the concave joints. Empty glumes transverse, narrow, rigid, 5-nerved, the flowering much shorter, thin and hyaline. — Low annuals, branching at the base, with narrow leaves and rigid often curved spikes. (Name from λεπτός, *narrow*, and οὐρά, *tail*, or spike.)

**L.** incurvàtus, Trin. Much branched, decumbent, 6′ high or less; spikes terminal and lateral, 1–4′ long, the base included in the broad sheath. — Borders of brackish marshes, Md. to S. Va., and on ballast northward. (Nat. from Eu.)

## 74. HÓRDEUM, Tourn. Barley. (Pl. 11.)

Spikelets 1-flowered, with an awl-shaped rudiment on the inner side, three at each joint of the rhachis of a terminal spike, but the lateral ones usually imperfect or abortive, and short-stalked. Empty glumes side by side in front of the spikelets, 6 in number, forming a kind of involucre, slender and awn-pointed or bristle-form. Flowering glume and palet herbaceous, the former (anterior) convex, long-awned from the apex. Stamens 3. Grain oblong, commonly adherent. — Spike often separating into joints. Ours annuals or biennials, or scarcely perennial. (The ancient Latin name.)

1. **H. jubàtum,** L. (Squirrel-tail Grass.) (Pl. 11, fig. 1, 2.) Low; lateral flowers abortive, on a short pedicel, short-awned; the perfect flower bearing a capillary awn (2′ long) about equalling the similar capillary glumes, all spreading. — Sandy sea-shore, upper Great Lakes, and westward. June.

2. **H. praténse,** Huds. Low (6–18′ high); lateral flowers imperfect or neutral, awnless or merely pointed; perfect flower with awn as long as those of the glumes (3–6″); spike linear, 1–2′ long. — Plains, especially in saline soil, Ohio to Ill. and westward; also sparingly introduced, Va., and southward along the coast. May, June. (Eu.)

## 75. **ÉLYMUS,** L. LYME-GRASS. WILD RYE. (Pl. 11.)

Spikelets 2 – 4 at each joint of the rhachis of a terminal spike, all fertile and alike, sessile, each 1 – 7-flowered. Glumes conspicuous, nearly side by side in front of the spikelets, 2 for each spikelet, forming an involucre to the cluster. Flower coriaceous; the glume rounded on the back, acute or awned at the apex. Grain adherent to the involving glume (whence the name, an ancient one for some grain, from *ἐλύω, to roll up*).

* *Glumes and flowers firm or rigid, all or only the latter awned; spikelets 1 – 5-flowered; slender perennials, with rather harsh and broad flat leaves.*

+ *Spike large and stout.*

1. **E. Virgínicus,** L. (Pl. 11, fig. 1 – 3.) Culm stout, 2 – 3° high; *spike rigidly upright, dense* (2 – 3′ long, 6″ thick), the short *peduncle usually included in the sheath;* spikelets 2 – 3 together, 2 – 3-flowered, smooth, rather short-awned, about the length of the thickened strongly-nerved and bristle-pointed *lanceolate glumes.* — River-banks; common. Aug.

2. **E. Canadénsis,** L. *Spike soon nodding* (5 – 9′ long), on an exserted peduncle; spikelets mostly in pairs, of 3 – 5 long-awned rough or rough-hairy flowers; the *awl-shaped glumes tipped with shorter awns.* — Var. GLAUCIFÒLIUS, Gray, is pale or glaucous throughout, the flowers with more spreading awns (1½′ long). — Var. INTERMÈDIUS, Vasey, has the awns scarcely longer than the glumes. — River-banks; common.

+ + *Spike and culm more slender.*

3. **E. striàtus,** Willd. More or less *pubescent; spike dense and thickish* (2 – 4′ long), upright or slightly nodding; spikelets mostly in pairs, 1 – 2- (or rarely 3-) flowered, minutely bristly-hairy; *glumes awl-shaped, bristle-awned,* 1 – 3-nerved, *about thrice the length of the flowers,* which are only 3″ long exclusive of the capillary awn (1′ long). — Var. VILLÒSUS, Gray, has very hairy flowers and glumes, and villous sheaths. — Rocky woods and banks. July, Aug.

4. **E. Sibíricus,** L., var. **Americànus.** *Glabrous; spike wand-like* (2 – 6′ long, 2 – 3″ thick), often somewhat nodding; spikelets in pairs, 3 – 6-flowered; *glumes linear-lanceolate,* 3 – 5-nerved, acuminate and smooth or often scabrous on the nerves, *short-awned, shorter than the flowers,* which bear an erect awn of once or twice their length. — Marquette, Mich. (*Porter*), N. Minn., and westward.

* * *Glumes and palet awnless and soft in texture; reed-like perennials.*

5. **E. móllis,** Trin. Culm (3° high) velvety at top; spike thick, erect (8′ long); spikelets 2 or 3 at each joint, 5 – 8-flowered; the lanceolate pointed 5 – 7-nerved glumes (1′ long) and the pointed flowers soft-villous; rhachis of the spikelets separating into joints. — Shore of the Great Lakes, Maine, and northward. (Near E. arenarius.)

* * * *Empty glumes very narrow, and all very long-awned; spike disarticulating at maturity.*

6. **E. Sitànion,** Schultes. Low (½ – 2° high), stout; spike 1 – 4′ long, the peduncle slightly exserted; the spreading scabrous awns 2 – 3′ long. — Central Minn. to Kan., and westward.

### 76. ASPRÉLLA, Willd. Bottle-brush Grass. (Pl. 11.)

Spikelets 2 – 3 or sometimes solitary on each joint of the rhachis of a terminal spike, raised on a very short callous pedicel, loosely 2 – 4-flowered (when solitary flatwise on the rhachis). Glumes none! or small, awn-like, and deciduous. Otherwise nearly as in Elymus. (Name a diminutive of *asper*, rough or prickly.)

1. **A. Hýstrix**, Willd. Perennial; culms 3 – 4° high; leaves and sheaths smoothish; spike loose (3 – 6′ long); the spreading spikelets 2 – 3 together, early deciduous; flowers smoothish or often rough-hairy, tipped with an awn thrice their length (1′ long). (Gymnostichum Hystrix, *Schreb.*) — Moist woodlands. July, Aug.

### 77. ARUNDINÀRIA, Michx. Cane. (Pl. 11.)

Spikelets flattened, 5 – 14-flowered; the flowers somewhat separated on the jointed rhachis. Empty glumes very small, membranaceous, the upper one larger. Flowering glumes and palet herbaceous or somewhat membranaceous, the glume convex on the back, many-nerved, tapering into a mucronate point or bristle. Squamulæ 3, longer than the ovary. Stamens 3. Grain oblong, free. — Arborescent or shrubby grasses, simple or with fascicled branches, and with large spikelets in panicles or racemes; blade of the leaf jointed upon the sheath; flowers polygamous. (Name from *arundo*, a reed.)

1. **A. macrospérma**, Michx. (Large Cane.) (Pl. 11, fig. 1, 2.) Culms arborescent, 10 – 40° high and ½ – 3′ thick at base, rigid, simple the first year, branching the second, afterwards at indefinite periods fruiting, and soon after decaying; leaves lanceolate (1 – 2′ wide), smoothish or pubescent, the sheath ciliate on one margin, stoutly fimbriate each side of the base of the leaf; panicle lateral, composed of few simple racemes; spikelets 1 – 3′ long, purplish or pale, erect; flowering glume lanceolate, acute or acuminate, glabrous or pubescent, fringed (5 – 12″ long). — River-banks, S. Va. (?), Ky., and southward, forming cane-brakes. April.

Var. **suffruticòsa**, Munro. (Switch Cane. Small Cane.) Lower and more slender (2 – 10° high), often growing in water; leaves 4″ – 1′ broad; spikelets solitary or in a simple raceme at the summit of the branches, or frequently on leafless radical culms. (A. tecta, *Muhl.*) — Swamps and moist soil, Md., S. Ind. to S. E. Mo., and southward. Sometimes fruiting several years in succession.

# SERIES II.

## CRYPTOGAMOUS OR FLOWERLESS PLANTS.

VEGETABLES destitute of proper flowers (i. e. having no stamens nor pistils), and producing instead of seeds minute one-celled germinating bodies called *spores*, in which there is no embryo or rudimentary plantlet.

### CLASS III. ACROGENS.

Cryptogamous plants with a distinct axis or stem, growing from the apex, and commonly not with later increase in diameter, usually furnished with distinct leaves; reproduction by antheridia and archegonia, sometimes also by gemmation.

### SUBCLASS I. VASCULAR ACROGENS, OR PTERIDOPHYTES.[1]

Stems containing woody fibre and vessels (especially scalariform or spiral ducts). Antheridia or archegonia, or both, formed on a minute prothallus which is developed from the spore on germination, the archegonium containing a nucleus, which after fertilization becomes an oöspore and at length grows into the conspicuous spore-bearing plant.

### ORDER 130. EQUISETÀCEÆ. (HORSETAIL FAMILY.)

*Rush-like, often branching plants, with jointed and mostly hollow stems from running rootstocks, having sheaths at the joints, and, when fertile, terminated by the conical or spike-like fructification composed of shield-shaped stalked scales bearing the spore-cases beneath.* — A single genus.

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[1] The orders of this Subclass have been elaborated anew for this edition by Prof. DANIEL C. EATON of Yale University.

**1. EQUISÈTUM,** L. HORSETAIL. SCOURING RUSH. (Pl. 21.)

Spore-cases (*sporangia, thecæ*) 6 or 7, adhering to the under side of the angled shield-shaped scales of the spike, 1-celled, opening down the inner side and discharging the numerous loose spores. To the base of each spore are attached 4 thread-like and club-shaped elastic filaments, which roll up closely around the spore when moist, and uncoil when dry. — Rootstocks perennial, wide-creeping, hard and blackish, jointed, often branched and sometimes bearing small tubers. Stems erect, cylindrical, hollow, jointed; the surface striated or grooved with alternate ridges and furrows, the cuticle in most species containing silica in the form of minute granules, rosettes, or tubercles; the joints containing besides the central air-cavity a circle of smaller hollows beneath the furrows and a set of still smaller ones beneath the ridges; the nodes closed and solid, each bearing instead of leaves a sheath which is divided into teeth corresponding in number and position to the principal ridges of the stem; stomata in the furrows, each with two pairs of guard-cells, of which the outer pair is marked with radiating lines of silica. Branches, when present, in whorls from the base of the sheath, like the stem, but without the central air-cavity. Prothallus green, formed upon the ground, often variously lobed, usually diœcious. (The ancient name, from *equus*, horse, and *seta*, bristle.)

§ 1. *Annual-stemmed, not surviving the winter.*

* *Fruiting in spring from soft and rather succulent pale or brownish fertile stems, the sterile stems or branches appearing later, herbaceous and very different.*

+ *Fertile stems unbranched, destitute of chlorophyll and soon perishing; the sterile branching copiously.*

1. **E. arvénse,** L. (COMMON H.) Fertile stems (4 – 10′ high) with loose and usually distant about 8 – 12-toothed sheaths; the sterile slender (at length 1 – 2° high), 10 – 14-furrowed, producing long and simple or sparingly branched 4-angular branches, their teeth 4, herbaceous, lanceolate. — Moist, especially gravelly soil; very common. March – May. Rootstocks often bearing little tubers. — Var. CAMPÉSTRE, Milde, is a not uncommon state, in which the sterile stem bears a small fruiting spike at the summit. (Eu.)

+ + *Fertile stems when older producing herbaceous 3-sided branches, and lasting through the summer, except the naked top which perishes after fructification.*

2. **E. praténse,** Ehrh. Sterile and finally also the fertile stems producing *simple straight branches;* sheaths of the stem with ovate-lanceolate short teeth, those of the branches 3-toothed; stems more slender and the branches shorter than in the last. — Mich. to Minn., and northward. April, May. (Eu.)

3. **E. sylváticum,** L. Sterile and fertile stems (about 12-furrowed) producing *compound racemed branches;* sheaths loose, with 8 – 14 rather blunt teeth, those of the branches bearing 4 or 5, of the branchlets 3, lance-pointed divergent teeth. — Wet shady places; common northward. May. (Eu.)

* * *Fruiting in summer; stems all of one kind, or the fertile contemporaneous with and like the sterile, equally herbaceous, producing mostly simple branches, or sometimes nearly naked.*

4. **E. palústre,** L. Stems (10 – 18′ high) slender, very deeply 5 – 9-grooved, *the ridges narrow and acute,* roughish, the lance-awl shaped teeth

whitish-margined; branches always hollow, 4–7-angled, rather few in a whorl. — Wet places, Niagara River (*Clinton*), Wisc. (*Austin*), and northward. June. (Eu.)

5. **E. littoràle,** Kühlewein. Stems (8–18′ high) slender, deeply 6–16-grooved, *the ridges rounded*, the teeth shorter than in the last, narrowly white-margined; branches often solid, 3–4-angled, 2–6 in a whorl. — Wet sandy shores, Vt. and N. Y., and northward. — Spores always abortive, whence the plant has been considered a hybrid, perhaps of E. arvense and E. limosum. July. (Eu.)

6. **E. limòsum,** L. (Pl. 21, fig. 1–5.) Stems (2–5° high) *slightly many-furrowed*, smooth, sometimes continuing unbranched, but usually producing ascending branches after fructification; sheaths appressed, with 10–22 (commonly about 18) dark-brown and acute rigid short teeth. — In shallow water; rather common. — Air-cavities none under the grooves, but small ones under the ridges. A form in which the branches bear numerous small spikes is var. POLYSTÀCHYUM, Brückner. June, July. (Eu.)

§ 2. *Stems all alike, evergreen, unbranched, or producing a few slender erect branches; fruiting in summer. Central air-cavity of the stem very large.*

* *Stems tall and stout (1½–4° or even 6° high), simple, or casually branched, evenly many-grooved; sheaths appressed.*

7. **E. hyemàle,** L. (SCOURING-RUSH. SHAVE-GRASS.) Stems 1½–4° high, 8–34 grooved, the *ridges* roughened by two more or less distinct lines of *tubercles; sheaths elongated*, with a black girdle above the base and a black limb; ridges of the sheaths obscurely 4-carinate, the teeth blackish, membranaceous, soon falling off. — Wet banks; common northward. Formerly in common use for polishing wood and metal. (Eu.)

8. **E. robústum,** Braun. Stems tall and stout (sometimes 8–10° high and nearly an inch thick), 20–48-grooved, the *ridges* roughened *with one line of transversely oblong tubercles; sheaths rather short*, with a black girdle at base and a black limb; ridges of the sheaths tricarinate, the blackish teeth soon falling off. — River-banks, Ohio and westward.

9. **E. lævigàtum,** Braun. Stems 1–4° high, rather slender, pale green, 14–30-grooved, the ridges almost smooth; sheath slightly enlarged upward, with a black girdle at the base of the mostly deciduous white-margined teeth, and rarely also at the base of the sheath; ridges of the sheath with one keel, or sometimes obscurely tricarinate. — By streams and in clayey places, Ohio to Minn., and westward.

* * *Stems slender, in tufts, 5–10-grooved; sheaths looser.*

10. **E. variegàtum,** Schleicher. *Stems ascending* (6–18′ long), usually simple from a branched base, 5–10-*grooved;* sheaths green variegated with black above, the 5–10 teeth tipped with a deciduous bristle. — Shores or river-banks, N. H. (Bellows Falls, *Carey*) and Niagara to Minn., and northward; rare. (Eu.)

11. **E. scirpoìdes,** Michx. *Stems very numerous in a tuft, filiform* (3–6′ high), *flexuous and curving, mostly* 6-*grooved*, with acute ridges; *sheaths* 3-*toothed*, the bristle-pointed teeth more persistent; central air-cavity wanting. — Wooded hillsides, N. Eng. to Penn., Minn., and northward. (Eu.)

## ORDER 131. FÍLICES. (FERNS,)

*Leafy plants, with the leaves* (fronds) *usually raised on a stalk or petiole* (stipe), *rising from a* (sometimes greatly elongated) *rootstock, separately rolled up* (circinate) *in the bud, and bearing on the under surface or along the margin small reticulated sporangia, which at length split open and discharge the numerous minute spores. Prothallus green, above ground, normally monœcious.*

SUBORDER I. **Polypodiàceæ.** Sporangia collected in dots, lines, or variously shaped clusters (*sori* or *fruit-dots*) on the back or margins of the frond or its divisions, cellular-reticulated, stalked, the stalk running into a vertical incomplete many-jointed ring, which by straightening at maturity ruptures the sporangium transversely on the inner side, discharging the spores. Fruit-dots often covered (at least when young) by a membrane called the *indusium* (or less properly the *involucre*), growing either from the back or the margin of the frond. (Plates 16–19.)

**Tribe I. POLYPODIEÆ.** Fructification on the back of the frond, in round or roundish fruit-dots (*sori*) placed on the veins or at the ends of the veins, without indusium of any kind. Stipes articulated to the rootstock, leaving a distinct scar when separated. Veins free (not reticulated) in our species.

1. **Polypodium.** Sori round, in one or more rows, on each side of the midrib or of the segments of the frond.

**Tribe II. GRAMMITIDEÆ.** Sori more or less elongated, without indusium, placed on the back of the frond, usually along the veins or near their extremities. Veins free in our species.

2. **Notholæna.** Sori short, of few rather large sporangia, placed near the tips of the veins; under surface of the frond usually either chaffy, woolly, or powdery.

**Tribe III. PTERIDEÆ.** Fructification marginal or intramarginal, provided with a general indusium formed of the (either altered or unchanged) margin of the frond. Stipes not articulated to the rootstock. Veins free in all our species.

* Sporangia at the ends of the veins, on a reflexed portion of the margin of the frond.

3. **Adiantum.** Midrib of the pinnules marginal or none. Stipe black and polished.

* * Sporangia borne on a continuous marginal vein-like receptacle, connecting the apices of the veins, and covered by a delicate whitish indusium formed of the reflexed margin.

4. **Pteris.** Midrib of the pinnules central. Stipe light-colored.

* * * Sporangia at or near the ends of the unconnected veins, borne on the under surface of the frond; indusium various.

5. **Cheilanthes.** Sori minute, at the ends of the veins; indusium continuous or interrupted. Fronds mostly chaffy, woolly, or pulverulent, rarely smooth.
6. **Pellæa.** Sori on the upper part of the veins, distinct, or mostly forming a confluent submarginal band of sporangia. Indusium membranaceous, continuous, rarely wanting. Sterile and fertile fronds not very unlike; stipes dark-colored; fronds smooth.
7. **Cryptogramme.** Sori roundish or elongated and extending far down the free veins, at first covered by the very broad continuous indusium, at length exposed and confluent. Sterile and fertile fronds very different; stipes light-colored; fronds smooth.

**Tribe IV. BLECHNEÆ.** Sori oblong or linear, borne on a veinlet parallel to the midrib, and covered with a special usually concave or arched indusium attached to the fruiting veinlet, and opening along the inner side.

8. **Woodwardia.** Sori forming a chain-like row each side of the midrib or central vein. Veins reticulated.

**Tribe V. ASPLENIEÆ.** Sori more or less elongated, occupying one or both sides of oblique veins, covered by a special indusium which is attached by one side to the fertile vein, and is free on the other. Stipes not articulated.

9. **Asplenium.** Sori on the upper side or rarely on both sides of a veinlet. Veins free in all our species.
10. **Scolopendrium.** Sori linear, confluent in pairs, each pair appearing like a single sorus with a double indusium opening down the middle. Veins free.
11. **Camptosorus.** Sori oblong, variously curved, or some of them in opposite pairs. Veins reticulated.

**Tribe VI. ASPIDIEÆ.** Sori round or roundish, on the back or rarely at the apex of the vein, with a special indusium, rarely naked. Stipes not articulated to the rootstock.

* Indusium obsolete or none.

12. **Phegopteris.** Sori round, rather small. Veins free in our species.

* * Indusium evident, round or roundish, covering the sporangia, at least when young. Sterile and fertile fronds not very unlike. Veins free in our species.

13. **Aspidium.** Indusium flat or slightly convex, orbicular or round-reniform, fixed by the centre, opening all round the margin.
14. **Cystopteris.** Indusium convex, fixed by a broad base partly under the sorus, commonly reflexed as the sporangia ripen.

* * * Indusium obscure, irregularly semicircular. Fertile fronds much contracted and very unlike the sterile ones.

15. **Onoclea.** Sporangia on an elevated receptacle ; divisions of the fertile frond pod-like or berry-like.

**Tribe VII. WOODSIEÆ.** Sori round, borne on the veins; indusium fixed under the sorus, divided into segments or into slender filaments.

16. **Woodsia.** Small ferns with free veins. Indusium very delicate.

**Tribe VIII. DICKSONIEÆ.** Sori roundish, marginal or submarginal. Indusium cup-shaped or two-valved, the outer portion composed of a reflexed lobule of the frond, or more or less united to it.

17. **Dicksonia.** Indusium in our species small, membranaceous, nearly globular. Frond elongated, decompound.

SUBORDER II. **Hymenophyllàceæ.** Sporangia sessile on a bristle-like receptacle within a cup-shaped or bivalvular involucre, the ring transverse and complete. Fronds delicately membranaceous.

18. **Trichomanes.** Involucres funnel-form or cup-shaped.

SUBORDER III. **Schizæàceæ.** Sporangia ovate, sessile, having a complete transverse articulated ring at the apex, and opening by a longitudinal slit. (Pl. 19.)

19. **Schizæa.** Sporangia naked, fixed in a double row to the midrib of the narrow fertile segments. Sterile fronds rigid, simple or dichotomously branched.
20. **Lygodium.** Sporangia borne in a double row on narrow fertile segments, each sporangium seated on a separate veinlet, and provided with a special scale-like indusium. Fronds leafy, climbing.

SUBORDER IV. **Osmundàceæ.** Sporangia naked, globose, mostly pedicelled, reticulated, with no ring or mere traces of one near the apex, opening into two valves by a longitudinal slit. Stipes winged at base and almost stipulate! (Pl. 19.)

21. **Osmunda.** Fertile pinnæ or fronds very much contracted, bearing the abundant and large sporangia upon the margins of the very narrow segments. Veins free.

## 1. POLYPÒDIUM, L. Polypody. (Pl. 16.)

Fruit-dots round, naked, arranged on the back of the frond in one or more rows each side of the midrib or central vein, or irregularly scattered, each borne in our species on the end of a free veinlet. Rootstocks creeping, branched, often covered with chaffy scales, bearing scattered roundish knobs, to which the stipes are attached by a distinct articulation. (Name from πολύς, *many*, and ποῦς, *foot*, alluding to the branching rootstock.)

1. **P. vulgàre,** L. (Pl. 16, fig. 1 – 3.) Fronds evergreen, oblong, *smooth both sides*, 4 – 10′ high, simple and deeply pinnatifid; the divisions linear-oblong, obtuse or somewhat acute, remotely and obscurely toothed; veins once or twice forked; *fruit-dots large, midway between the midrib and the margin.* — Rocks; common. July. (Eu.)

2. **P. incànum,** Swartz. Fronds evergreen and coriaceous, oblong, 2 – 6′ high, *grayish and very scurfy underneath with peltate scales*, simply pinnatifid; the divisions oblong-linear, obtuse; *fruit-dots rather small, near the margin;* veins forking, free in the N. American plant! — Rocks and trunks of trees, Va. and Ohio to Ill., and southward. Aug.

## 2. NOTHOLÆNA, R. Brown. Cloak-Fern.

Fruit-dots roundish or oblong, placed near the ends of the veins, soon more or less confluent into an irregular marginal band, with no proper involucre. Veins always free. Fronds of small size, 1 – 4-pinnate, the lower surface almost always either hairy, tomentose, chaffy, or covered with a fine waxy white or yellow powder. (Name from νόθος, *spurious*, and λαῖνα, *a cloak*, the woolly coating of the original species forming a spurious covering to the sporangia.)

1. **N. dealbàta,** Kunze. Fronds triangular-ovate, 1 – 3′ long, 3 – 4-pinnate; rhachis and branches straight, black and shining; ultimate pinnules scarcely a line long, white and powdery on the lower surface. — Clefts of calcareous rocks, Mo., Kan., and southwestward. July – Aug.

## 3. ADIÁNTUM, L. Maidenhair. (Pl. 17.)

Fruit-dots marginal, short, borne on the under side of a transversely oblong, crescent-shaped or roundish, more or less altered margin or summit of a lobe or tooth of the frond reflexed to form an indusium; the sporangia attached to the approximated tips of the free forking veins. — Main rib (costa) of the pinnules none (in our species), or at the lower margin. Stipes black and polished. (The ancient name, from α- privative and διαίνω, meaning *unwetted*, the smooth foliage repelling rain-drops.)

1. **A. pedàtum,** L. (Pl. 17, fig. 1 – 3.) *Frond forked at the summit of the upright slender stalk* (9 – 15′ high), the recurved branches bearing on one side several slender spreading pinnate divisions; pinnules numerous, short-stalked and obliquely triangular-oblong, entire on the lower margin, from which the veins all proceed, and cleft and fruit-bearing on the other. — Rich, moist woods. July. — A delicate and most graceful Fern.

2. **A. Capíllus-Véneris,** L. *Fronds with a continuous main rhachis, ovate-lanceolate*, 9 – 18′ long, often pendent, 2 – 3-pinnate at the base, the upper third or half simply pinnate; pinnules wedge-obovate or rhomboid, 6 – 12″ long, deeply and irregularly incised; veinlets flabellately forking from the

base; involucres lunulate or transversely oblong. — Moist rocky places, Va. to Mo., and southward. (Eu.)

### 4. PTÈRIS, L. Brake or Bracken. (Pl. 17.)

Sporangia in a continuous slender line of fructification, occupying the entire margin of the fertile frond, and covered by its reflexed narrow edge which forms a continuous membranaceous indusium, attached to an uninterrupted transverse vein-like receptacle connecting the tips of the forked free veins. — Fronds 1 – 3-pinnate or decompound. (The ancient Greek name of Ferns, from πτερόν, *a wing*, on account of the prevalent pinnate or feathery fronds.)

1. **P. aquilìna**, L. (Common Brake.) Frond dull green (2 – 3° wide), ternate at the summit of an erect stout stalk (1 – 2° high), the widely spreading branches twice pinnate; pinnules oblong-lanceolate; the upper undivided; the lower more or less pinnatifid, with oblong obtuse lobes, margined all round with the indusium, which is really double in this species. — Var. caudàta, with the lobes very narrow and revolute, the terminal ones much elongated, is a southern form, which extends in a modified condition as far north as New Jersey. — Thickets and hillsides, common. Aug. (Eu.)

### 5. CHEILÁNTHES, Swartz. Lip-Fern. (Pl. 17.)

Sporangia borne on the thickened ends of free veinlets, forming small and roundish distinct or nearly contiguous marginal fruit-dots, covered by a mostly whitish and membranaceous, sometimes herbaceous, common indusium, formed of the reflexed margin of separate lobes or of the whole pinnule. — Low, mostly with 2 – 3-pinnate and hairy or chaffy, rarely smooth fronds, the sterile and fertile nearly alike, the divisions with the principal vein central. Some species with continuous indusium connect this genus very closely with the next. (Name composed of χεῖλος, *a lip*, and ἄνθος, *flower*, from the shape of the indusium.)

* *Fronds smooth, or at most hairy.*

1. **C. Alabaménsis**, Kunze. *Fronds smooth*, chartaceous (2 – 8′ long), ovate-lanceolate, bipinnate; pinnæ numerous, oblong-lanceolate; pinnules triangular-oblong, rather acute, often auriculate or lobed; *indusium continuous, rather broad, pale, and of firm consistence.* — On rocks, mountains of Va. to Ky., and southward.

2. **C. vestìta**, Swartz. (Pl. 17, fig. 1, 2.) Fronds (6 – 15′ high), lanceolate-oblong, hirsute, as are the brown and shining stipes, with *straightish prominently articulated rusty hairs*, twice pinnate; pinnæ rather distant, triangular-ovate; pinnules oblong, crowded (2 – 4″ long), more or less incised, *the ends of the roundish or oblong lobes reflexed and forming separate herbaceous involucres*, which are pushed back by the ripened sporangia. — Clefts of rocks, Manhattan Island (*W. W. Denslow*) and N. J. to Ill., and southward.

* * *Fronds woolly or tomentose.*

3. **C. tomentòsa**, Link. Fronds (12–20′ high) lanceolate-oblong, densely tomentose with *slender and entangled whitish obscurely articulated hairs*, thrice pinnate; primary and secondary pinnæ oblong or ovate-oblong; *pinnules distinct*, minute (½ – 1″ long), roundish-obovate, sessile or adnate-decurrent, the upper surface less woolly, *the reflexed narrow margin forming a continuous some-*

*what membranaceous indusium.* — Mountains of Va. and Ky.; thence west and southward. — Stipe and rhachis rather stout, brown, covered with narrow chaffy scales and whitish hairs.

4. **C. lanuginòsa,** Nutt. Stipes slender, at first hairy, black or brown, shining; fronds (3 – 6′ high) ovate-lanceolate, woolly with *soft whitish distinctly articulated flattened hairs,* becoming smoother above, twice or thrice pinnate; pinnæ (5 – 6″ long) ovate, the lowest distant, the others contiguous; *pinnules crenately pinnatifid,* or mostly divided into minute and roundish densely crowded segments (½ – 1″ long), *the herbaceous margin recurved forming an almost continuous indusium.* — In dense tufts, on dry rocks and cliffs, Ill. to Minn., thence west and southward.

### 6. PELLÆA, Link. CLIFF-BRAKE. (Pl. 16.)

Sporangia in roundish or elongated clusters on the upper part of the free veins, distinct, or confluent laterally so as to imitate the marginal continuous line of fructification of Pteris, commonly covered by a broad membranaceous and continuous (rarely interrupted) general indusium, which consists of the reflexed and altered margin of the fertile pinnule or division. Small ferns, with 1 – 3-pinnate fronds, the fertile ones with narrower divisions than the sterile, but otherwise similar. Stipes generally dark-colored, smooth and shining. (Name from πελλός, *dusky,* alluding to the stipe.)

1. **P. grácilis,** Hook. (Pl. 16.) Fronds smooth (3 – 6′ high), *delicately membranaceous and slender,* of few pinnæ, the lower ones once or twice pinnately parted into 3 – 5 decurrent divisions, those of the fertile frond oblong or linear-oblong, entire or sparingly incised; of the sterile ovate or obovate, crenate or incised; veins of the fertile fronds mostly only once forked. — Shaded calcareous rocks, Mass. to Minn., and northward; rare. July. — Rootstock very slender, creeping; stipes polished, brownish, darker and sparingly chaffy at base.

2. **P. atropurpùrea,** Link. Smooth, except some bristly-chaffy hairs on the midribs and especially on the *dark purple and polished stalk* and rhachis, 6 – 15′ high; *frond coriaceous,* pale, once or below twice pinnate; the divisions broadly linear or oblong, or the sterile sometimes oval, chiefly entire, somewhat heart-shaped or else truncate at the stalked base; veins about twice forked. — Dry calcareous rocks; not common, but of wide range. July. — Rootstock short and stout; stipes clustered.

### 7. CRYPTOGRÁMME, R. Brown. ROCK-BRAKE.

Fruit-dots roundish or elongated and extending far down on the free forking veins. True involucre or indusium none, the herbaceous margins of the fertile segments at first reflexed and meeting at the midrib, at length opening out flat and exposing the confluent sporangia. — Low ferns, with smooth, 2 – 3-pinnate fronds, the fertile ones taller than the sterile, and with much narrower divisions. (Name from κρυπτός, *hidden,* and γραμμή, *a line,* alluding to the lines of sporangia at first concealed by the reflexed margin.)

1. **C. acrostichoìdes,** R. Brown. Stipes densely tufted, straw-colored; fronds 2 – 3-pinnate (6 – 10′ high); fertile segments stalked, linear or linear-oblong (3 – 5″ long), the sporangia in lines extending down the veins almost

to the midrib, confluent when ripe and covering the under surface of the now fully opened segments; sterile fronds on much shorter stipes, with ovate or obovate decurrent and crenately toothed or incised segments. (Allosorus acrostichoides, *Sprengel.*) — On rocks, from L. Superior westward and northward. — Very near C. crispa of Eu.

### 8. WOODWÁRDIA, Smith. Chain-Fern. (Pl. 17.)

Fruit-dots oblong or linear, arranged in one or more chain-like rows on transverse anastomosing veinlets parallel and near to the midrib. Indusium fixed by its outer margin to the fruitful veinlet, free and opening on the side next the midrib. Veins more or less reticulated, free toward the margin of the frond. — Large ferns, with pinnatifid or pinnate fronds. (Named for *Thomas J. Woodward*, an English botanist.)

§ 1. ANCHÍSTEA. *Sterile and fertile fronds alike; veins forming only one row of meshes (areoles).*

1. **W. Virgínica,** Smith. (Pl. 17, fig. 4, 5.) Fronds (2–3° high) pinnate, with numerous lanceolate pinnatifid pinnæ; segments oblong; veins forming a row of narrow areoles along the midrib both of the pinnæ and of the lobes, the outer veinlets free; fruit-dots oblong, one to each areole, confluent when ripe. — Wet swamps, Maine to Ark., and southward. Rootstocks creeping, often 6–8° long! July.

§ 2. LORINSÈRIA. *Sterile and fertile fronds unlike; veins of the sterile fronds forming many rows of meshes.*

2. **W. angustifòlia,** Smith. (Pl. 17, fig. 1–3.) Fronds pinnatifid; sterile ones (12–18′ high) with lanceolate serrulate divisions united by a broad wing; fertile fronds taller, with narrowly linear almost disconnected divisions, the areoles and fruit-dots (4–5″ long) in a single row each side of the secondary midribs; rootstocks creeping. — Wet woods, New Eng., near the coast, to Ark., and southward; rare. Aug., Sept.

### 9. ASPLÈNIUM, L. Spleenwort. (Pl. 18.)

Fruit-dots oblong or linear, oblique, separate; the straight, or rarely curved, indusium fixed lengthwise by one edge to the upper (inner) side of the fertile vein; — in some species a part of the fruit-dots are double, the fertile vein bearing two indusia placed back to back. Veins free in all our species. (Name from *α-* privative and *σπλήν, the spleen*, for supposed remedial properties.)

§ 1. ASPLENIUM proper. *Indusium straight or slightly curved, attached to the upper side of the vein, rarely double.*

* *Small evergreen ferns; fronds pinnatifid, or pinnate only near the base.*

1. **A. pinnatífidum,** Nutt. *Fronds* (3–6′ long) lanceolate, *pinnatifid, or pinnate below, tapering above into a slender prolongation,* "the apex sometimes rooting"; *lobes roundish-ovate, obtuse, or the lowest pair long-acuminate;* fruit-dots irregular, those next the midrib often double, even the slender prolongation fertile. — On cliffs and rocks, Penn. to Mo., and southward; very rare. July. — Resembles the Walking-Leaf (Camptosorus), but the veins are free. *Stipes brownish, becoming green above, and so passing into the broad pale green midrib.*

2. **A. ebenoìdes,** R. R. Scott. *Fronds* (4 – 9′ long) broadly lanceolate *pinnatifid, below pinnate, the apex prolonged and slender; divisions lanceolate from a broad base, the lower ones shorter,* often proliferous, as is the apex of the frond; fruit-dots much as in the last; *stipes black and polished, as is the lower part of the midrib, especially beneath.* — Limestone cliffs, Conn. and Penn., and southward; very rare, usually growing with Camptosorus and Asplenium ebeneum, of which *Rev. M. G. Berkeley* considered it a probable hybrid.

* * *Small evergreen ferns; the narrow fronds simply pinnate with numerous pinnæ.*

+ *Pinnæ not auricled.*

3. **A. víride,** Hudson. *Fronds* (2 – 5′ long) tufted, *linear in outline, pale green, softly herbaceous; pinnæ roundish-ovate or ovate-rhomboid,* short-stalked, crenately toothed (2 – 4″ long), the midvein indistinct and forking; *the slender stipe brownish and passing into a green herbaceous rhachis.* — Shaded cliffs; northern New Eng., west and northward; rare. (Eu.)

4. **A. Trichómanes,** L. *Fronds* (3 – 8′ long) in dense spreading tufts, *linear in outline, dark green and more rigid; pinnæ roundish-oblong or oval* (3 – 4″ long), entire or crenulate, rarely incised, unequal-sided, obliquely wedge-truncate at base, attached by a narrow point, the midvein forking and evanescent; *the thread-like stipe and rhachis purple-brown and shining.* — Shaded cliffs; common. July. (Eu.)

+ + *Pinnæ more or less auricled.*

5. **A. párvulum,** Mart. & Gal. Fronds upright (4 – 10′ high), narrowly linear-oblanceolate; *pinnæ* (2 – 6″ long) *rigid and thickish, mostly opposite,* nearly sessile, somewhat deflexed, oblong, obtuse, *entire or crenulate,* auricled on the upper or both sides; sori rather few, as near the margin as the continuous midvein; stipe and rhachis black and shining. — Mountains of Va. to Mo., and southward. — Nearly intermediate between the last and the next.

6. **A. ebèneum,** Ait. Fronds upright (9 – 18′ high), linear-oblanceolate in outline, fertile ones much the taller; *pinnæ* (6 – 18″ long) *firmly membranaceous, mostly alternate,* sessile, spreading, oblong or oblong-linear, *finely serrate or even incised,* the base auricled on the upper or both sides; sori many, nearer the elongated midvein than the margin; stipe and rhachis blackish-purple and shining. — Rocky, open woods; rather common.

* * * *Small evergreen ferns; the broader fronds* 1 – 3-*pinnate; pinnæ incised.*

7. **A. Bradlèyi,** D. C. Eaton. *Fronds oblong-lanceolate,* 4 – 7′ long, besides the blackish and somewhat shining stipe, membranaceous, pinnate; pinnæ rather numerous, *the lower ones no larger than the middle ones,* all short-stalked, oblong-ovate, obtuse, incised or pinnatifid into oblong toothed lobes. — On rocks, Ky. and southward; rare. A single plant has been gathered near Newburg, N. Y. — Intermediate between A. ebeneum and A. montanum.

8. **A. montànum,** Willd. *Fronds ovate-lanceolate from a broad base* (2 – 5′ long), subcoriaceous, pinnate; pinnæ ovate-oblong, the lowest pinnately cleft into oblong or ovate cut-toothed lobes, the upper gradually simpler; *rhachis green, broad and flat; stipe brown at base.* — Cliffs and rocks, from Conn. and Penn. to Ky., and southward. July.

9. **A. Rùta-murària,** L. *Fronds deltoid-ovate* (1 – 2½′ long), subcoriaceous, laxly 2 – 3-pinnate at base, the pinnæ alternate; *ultimate segments few,*

stalked (2 – 5″ long), *from narrowly cuneate to roundish-obovate*, toothed or incised at the apex; veins forking; sori 2 – 4 on a segment. — Limestone cliffs, Vt. to Mich., and southward; scarce. July. (Eu.)

* * * * *Tall ferns* (2 – 4° *high*), *not evergreen; fronds pinnate or sub-bipinnate.*

10. **A. angustifòlium,** Michx. *Fronds* thin, *simply pinnate; pinnæ* numerous, short-stalked, *linear-lanceolate, acuminate,* entire or crenulate (3 – 4′ long), *those of the fertile frond narrower;* fruit-dots linear, 20 – 40 each side of the midvein; indusia slightly convex. — Rich woods, W. New Eng. to Wisc., and southward along the mountains. Sept.

11. **A. thelypteroìdes,** Michx. (Pl. 18, fig. 1, 2.) *Fronds* (2 – 3° high) *pinnate; pinnæ deeply pinnatifid,* linear-lanceolate (3 – 5′ long); the lobes oblong, obtuse, minutely toothed, crowded, each bearing 3 – 6 pairs of *oblong fruit-dots,* some of them double. — Rich woods; not rare. July – Sept.

§ 2. ATHÝRIUM. *Indusium delicate, curved, often crossing the vein, and attached to both sides of it, thus becoming reniform, or shaped like a horseshoe.*

12. **A. Filix-fœ̀mina,** Bernh. Fronds (1 – 3° high) ovate-oblong or broadly lanceolate, twice pinnate; pinnæ lanceolate, numerous; pinnules confluent on the secondary rhachis by a narrow margin, oblong and doubly serrate, or elongated and pinnately incised with cut-toothed segments; fruit-dots short, variously curved, at length confluent. — Moist woods; common and presenting many varying forms. July. (Eu.)

### 10. SCOLOPÉNDRIUM, Smith. HART'S-TONGUE. (Pl. 18.)

Fruit-dots linear, elongated, almost at right angles to the midrib, contiguous by twos, one on the upper side of one veinlet, and the next on the lower side of the next superior veinlet, thus appearing to have a double indusium opening along the middle. (The ancient Greek name, so called because the numerous parallel lines of fruit resemble the feet of the centipede, or *Scolopendra.*)

1. **S. vulgàre,** Smith. Frond oblong-lanceolate from an auricled-heart-shaped base, entire or wavy-margined (7 – 18′ long, 1 – 2′ wide), bright green. — Shaded ravines and under limestone cliffs; central N. Y.; also in Canada and Tenn.; very rare. Aug. (Eu.)

### 11. CAMPTOSÒRUS, Link. WALKING-LEAF. (Pl. 18.)

Fruit-dots oblong or linear, as in Asplenium, but irregularly scattered on either side of the *reticulated veins* of the simple frond, those next the midrib single, the outer ones inclined to approximate in pairs (so that their two indusia open face to face), or to become confluent at their ends, thus forming crooked lines (whence the name, from καμπτός, *bent,* and σωρός, for *fruit-dot.*)

1. **C. rhizophýllus,** Link. Fronds evergreen, sub-coriaceous, growing in tufts, spreading or procumbent (4 – 12′ long), gradually narrowed from a cordate or auricled base to a long and slender acumination, which often roots at the end and forms a new plant. — Shaded rocks, especially calcareous rocks, N. Eng. to Minn., and southward to Kan. and Ala. — The auricles are sometimes greatly elongated, and even rooting; in another form they are lacking, as in the thinner leaved C. Sibiricus. July.

### 12. PHEGÓPTERIS, Fée. BEECH FERN.

Fruit-dots small, round, naked (no indusium), borne on the back of the veins below the apex. Stipe continuous with the rootstock. — Our species have free veins and bright green membranaceous fronds, decaying in early autumn. (Name composed of φηγός, an *oak* or *beech*, and πτερίς, *fern.*)

∗ *Fronds twice pinnatifid; pinnæ all sessile, adnate to the winged rhachis.*

1. **P. polypodioìdes,** Fée. Fronds triangular, *longer than broad* (4 – 9′ long), hairy on the veins, especially beneath; pinnæ linear-lanceolate, *the lowest pair deflexed and standing forward;* their divisions oblong, obtuse, entire, the basal decurrent upon the main rhachis; fruit-dots all near the margin. — Damp woods; common northward. July. — Rootstock slender, creeping, bearing a few distant slender stalks, rather longer than the fronds. (Eu.)

2. **P. hexagonóptera,** Fée. Fronds triangular, *usually broader than long* (7 – 12′ broad), slightly pubescent and often finely glandular beneath; pinnæ lanceolate; upper segments oblong, obtuse, toothed or entire, *those of the very large lowest pinnæ elongated and pinnately lobed,* basal ones very much decurrent and forming a continuous many-angled wing along the main rhachis; fruit-dots near the margin; some also between the sinus and the midrib. — Rather open woods, New Eng. to Minn., and southward; common. July. — Larger and broader than the last, which it often closely resembles.

∗ ∗ *Fronds ternate, the three divisions petioled; rhachis wingless.*

3. **P. Dryópteris,** Fée. *Fronds smooth,* broadly triangular (4 – 6′ wide); the three triangular primary divisions *all widely spreading,* 1 – 2-pinnate; segments oblong, obtuse, entire or toothed; fruit-dots near the margin. — Rocky woods; common northward. July. (Eu.)

4. **P. calcàrea,** Fée. *Fronds minutely glandular* and somewhat rigid, *the lateral divisions ascending;* lowest inferior pinnæ of the lateral divisions smaller in proportion than in the last species, which it otherwise closely resembles. — Iowa and Minn.; rare. July. (Eu.)

### 13. ASPÍDIUM, Swartz. SHIELD FERN. WOOD FERN. (Pl. 19.)

Fruit-dots round, borne on the back or rarely at the apex of the veins. Indusium covering the sporangia, flat or flattish, scarious, orbicular and peltate at the centre, or round-kidney-shaped and fixed either centrally or by the sinus, opening all round the margin. Stipe continuous (not articulated) with the rootstock. — Our species have free veins and 1 – 3-pinnate fronds. (Name, ἀσπίδιον, *a small shield,* from the shape of the indusium.)

§ 1. DRYÓPTERIS. *Indusium reniform, or orbicular with a narrow sinus.*

∗ *Veins simple or simply forked and straight; fronds annual, decaying in autumn, the stalks and slender creeping rootstocks nearly naked.*

1. **A. Thelýpteris,** Swartz. Fronds pinnate, lanceolate in outline; pinnæ horizontal or slightly recurved, linear-lanceolate, deeply pinnatifid, *the lowest pairs scarcely smaller;* lobes oblong, entire, obtuse or appearing acute when in fruit from the *strongly revolute margins; veins mostly forked,* bearing the (soon confluent) fruit-dots near their middle; indusium minute, smooth and naked. — Marshes; common. Aug. — Stalk 1° long or more, usually longer than the frond, which is of thicker texture than the next, and slightly downy. (Eu.)

2. **A. Noveboracénse,** Swartz. Fronds pinnate, lanceolate in outline, *tapering both ways from the middle;* pinnæ lanceolate, *the lowest 2 or more pairs gradually shorter and deflexed;* lobes flat, oblong, basal ones often enlarged and incised; *veins simple,* or forked in the basal lobes; fruit-dots distinct, near the margin; indusium minute, the margin glanduliferous.— Swamps and moist thickets; common. July. — Frond pale green, delicate and membranaceous, hairy beneath along the midribs and veins.

* * *Veins, at least the lowest, more than once forked or somewhat pinnately branching; fruit-bearing veinlets often obscure or vanishing above the fruit-dot; fronds, at least the sterile ones, often evergreen; stalks and apex of the thickened rootstock scaly or chaffy, and often the main rhachis also.*

+- *Fronds small, pinnate; pinnæ pinnatifid; indusia very large, persistent.*

3. **A. fràgrans,** Swartz. Fronds (4–12′ high) glandular and aromatic, narrowly lanceolate, with linear-oblong pinnately-parted pinnæ; their crowded divisions (2″ long) oblong, obtuse, toothed or nearly entire, nearly covered beneath with the very large thin imbricated indusia, which are orbicular with a narrow sinus, the margin sparingly glanduliferous and often ragged. — On rocks, especially near waterfalls, mountains of northern New Eng., west and northward. — Rootstock stout, nearly erect, densely chaffy, as are the crowded stipes and rhachis. (Asia, and barely reaching S. E. Eu.)

+- +- *Large* (1–2½° *high*), *the fronds mostly twice pinnate with variously toothed and incised pinnules; indusia rather small, shrivelled in age, or deciduous.*

4. **A. spinulòsum,** Swartz. Stipes with a few *pale-brown decíduous scales;* frond ovate-lanceolate, twice pinnate; *pinnæ oblique to the rhachis, elongated-triangular,* the lower pairs broadly triangular; pinnules set obliquely on the midribs, connected by a very narrow wing, oblong, acute, incisely serrate or pinnatifid with spinulosely-toothed lobes; *indusium* smooth and *without marginal glands.* — In damp woods, New Eng. to Ky., and northward. July. — The common European type, rare in North America. (Eu.)

Var. **intermèdium,** D. C. Eaton. *Scales* of the stipe few, *brown with a darker centre;* frond broadly oblong-ovate, twice or often thrice pinnate; *pinnæ spreading, oblong-lanceolate,* the lower unequally triangular-ovate; pinnules crowded, ovate-oblong, spreading, pinnately divided; the oblong lobes spinulose-toothed at the apex; *margin of the indusium denticulate and beset with minute stalked glands.* — Woods, everywhere.

Var. **dilatàtum,** Hook. *Scales* of the stipe large, *brown with a dark centre; frond broader, ovate or triangular-ovate* in outline, oftenest thrice pinnate; pinnules lance-oblong, the lowest often much elongated; *indusium* (in the North American plant) *smooth and naked.* — A dwarf state, fruiting when only 5–8′ high, answers to var. dumetorum. — N. New Eng. to Minn., chiefly in mountain woods, and northward. (Eu.)

5. **A. Boòttii,** Tuckerman. *Scales* of the stipe *pale-brown:* fronds (1–2½° long) elongated-lanceolate in outline, somewhat narrowed at base; lowest pinnæ triangular-ovate, the upper longer and narrower; pinnules oblong-ovate, sharply spinulose-serrate or the lower pinnatifid; *indusium minutely glandular.* (A. spinulosum, var. Boottii, of last ed. A. cristatum, var. uliginosum, *Milde.*) — Wet thickets and about ponds, New Eng. to Del. and Minn. July. — Sterile fronds much smaller and simpler than the fertile. (Eu.)

+ + + *Large* (2 – 4° *high*); *fronds once pinnate and the pinnæ deeply pinnatifid, or nearly twice pinnate; fruit-dots not very near the margin; the indusium large, thinnish and flat, persistent.*

6. **A. cristàtum,** Swartz. *Frond linear-oblong or lanceolate in outline* (1 – 2° long); *pinnæ short* (2 – 3′ long), *triangular-oblong*, or the lowest nearly triangular-ovate, from a somewhat heart-shaped base, acute, deeply pinnatifid; the *divisions* (6 – 10 *pairs*) *oblong*, very obtuse, finely serrate or cut-toothed, the lowest pinnatifid-lobed; *fruit-dots as near the midvein as the margin;* indusium round-reniform, the sinus mostly shallow, smooth and naked. — Swamps, etc.; common. July. — Stipes and the stout creeping rootstock bearing broad and deciduous chaffy scales. (Eu.)

Var. **Clintoniànum.** *Frond in every way much larger* (2½ – 4° long), *pinnæ* oblong-lanceolate, *broadest at base* (4 – 6′ long, 1 – 2′ broad), deeply pinnatifid; the *divisions* (8 – 16 *pairs*) crowded or distant, *linear-oblong*, obtuse, obscurely serrate or cut-toothed, the basal sometimes pinnately lobed; veins pinnately forking, the lowest anterior veinlets bearing the *fruit-dots near the midvein;* indusium orbicular with a shallow sinus, smooth and naked. — Swampy woods, New Eng. to N. J., N. Y. (*G. W. Clinton*, etc.), and westward. July. — Rootstock stout, creeping, chaffy (like the stipes) with large bright-brown scales. A showy fern, unlike any European form of A. cristatum, and often mistaken for A. Goldianum.

7. **A. Goldiànum,** Hook. *Frond broadly ovate*, or the fertile ovate-oblong in outline (2 – 3° long); *pinnæ* (6 – 9′ long), oblong-lanceolate, *broadest in the middle*, pinnately parted; the *divisions* (*about* 20 *pairs*) *oblong-linear, slightly scythe-shaped* (9 – 15″ long), serrate with appressed teeth; veins pinnately forking and bearing the *fruit-dots very near the midvein;* indusium very large, orbicular with a deep narrow sinus, smooth and without marginal glands. — Rich and moist woods, from Conn. to Ky., and northward. July. — A stately fern, often 4° high, the fronds growing in a circle from a stout ascending chaffy rootstock, and decaying in autumn. Indusium with the sides of the sinus often overlapping, thus appearing to be round and entire as in § Polystichum.

+ + + + *Large* (1 – 3° *high*); *stipes very chaffy at base; fronds twice pinnate, but the upper pinnules confluent, some of the lower pinnatifid-toothed; fruit-dots rather large; indusium convex, without marginal glands, persistent.*

8. **A. Fílix-mas,** Swartz. Frond lanceolate in outline (1 – 3° high); pinnæ linear-lanceolate, tapering from base to apex; pinnules oblong, very obtuse, serrate at the apex and obscurely so at the sides, the basal incisely lobed, distinct, the upper confluent; fruit-dots nearer the midvein than the margin, and usually confined to the lower half of each fertile pinnule. — Rocky woods, N. Mich. to Dak. and Col. — Frond thickish but not surviving the winter. (Eu.)

9. **A. marginàle,** Swartz. (Pl. 19, fig. 1, 2.) Frond evergreen, smooth, thickish and almost coriaceous, ovate-oblong in outline (1 – 2° long); pinnæ lanceolate, acuminate, slightly broadest above the base; pinnules oblong or oblong-scythe-shaped, crowded, obtuse or pointed, entire or crenately-toothed; fruit-dots close to the margin. — Rocky hillsides in rich woods; common, especially northward. Aug.

§ 2. POLÝSTICHUM. *Indusium orbicular and entire, peltate, fixed by the depressed centre; fronds rigid and coriaceous, evergreen, very chaffy on the rhachis, etc.; pinnæ or pinnules auricled at base on the upper side, crowded, the teeth or lobes bristle-tipped.*

* *Fronds simply pinnate.*

10. **A. acrostichoìdes,** Swartz. (Christmas Fern.) (Pl. 19, fig. 3, 4.) Frond lanceolate (1 – 2½° high), *stalked; pinnæ linear-lanceolate*, somewhat scythe-shaped, half-halberd-shaped at the slightly stalked base, serrulate with appressed bristly teeth; *the fertile* (upper) *contracted and smaller*, bearing contiguous fruit-dots near the midrib, which are confluent with age, covering the surface. — Var. incìsum is a state with cut-lobed pinnæ, a not unfrequent case in the sterile fronds; sometimes with all the tips fertile. — Common in rocky woods, especially northward. July.

11. **A. Lonchitis,** Swartz. Frond linear-lanceolate (9 – 20′ high), *scarcely stalked, very rigid; pinnæ broadly lanceolate-scythe-shaped, or the lowest triangular*, strongly auricled on the upper side, and wedge-truncate on the lower, densely spinulose-toothed (1′ or less in length), copiously fruit-bearing; fruit-dots contiguous and near the margins. — Woods, southern shore of Lake Superior, and northward. (Eu.)

* * *Fronds bipinnate.*

12. **A. aculeàtum,** Swartz, var. **Braùnii,** Koch. *Fronds spreading* (1½ – 2° long), oblong-lanceolate in outline, with a tapering base, the lower of the many pairs of oblong-lanceolate pinnæ gradually reduced in size and obtuse; pinnules ovate or oblong, obtuse, truncate and almost rectangular at base, short-stalked, or the upper confluent, sharply toothed, beset with long and soft as well as chaffy hairs. — Deep woods, mountains of New Eng., N. Y., and Penn., and northward. (Eu.)

### 14. CYSTÓPTERIS, Bernhardi. Bladder Fern. (Pl. 19.)

Fruit-dots roundish, borne on the back of a straight fork of the free veins; the delicate indusium hood-like or arched, attached by a broad base on the inner side (toward the midrib) partly under the fruit-dot, early opening free at the other side, which looks toward the apex of the lobe, and is somewhat jagged, soon thrown back or withering away. — Tufted ferns with slender and delicate 2 – 3-pinnate fronds; the lobes cut-toothed. (Name composed of *κύστις, a bladder*, and *πτερίς, fern*, from the inflated indusium.)

1. **C. bulbífera,** Bernh. (Pl. 19, fig. 1 – 3.) *Frond lanceolate, elongated* (1 – 2° long), 2-pinnate; the pinnæ lanceolate-oblong, pointed, horizontal (1 – 2′ long); the *rhachis and pinnæ often bearing bulblets underneath, wingless;* pinnules crowded, oblong, obtuse, toothed or pinnatifid; indusium short, truncate on the free side. — Shaded ravines, not rare from N. Eng. to Ark., commoner on calcareous rocks. July. — Specimens from Tenn. and Ark. have sometimes shorter fronds and few or no bulblets, indicating an approach to the next species.

2. **C. frágilis,** Bernh. *Frond oblong-lanceolate* (4 – 8′ long, besides the brittle stalk which is fully as long), 2 – 3-pinnate; the pinnæ and *pinnules* ovate or lanceolate in outline, irregularly pinnatifid or cut-toothed, mostly acute,

*decurrent on the margined or winged rhachis;* indusium tapering or acute at the free end. — Shaded cliffs and rocky woods; common and greatly varying in the shape and cutting of the pinnules. July. (Eu.)

### 15. ONOCLÈA, L. (Pl. 16 and 19.)

Sporangia borne on elevated receptacles, forming roundish sori imperfectly covered by very delicate hood-shaped indusia attached to the base of the receptacles. Fertile fronds erect, rigid, with contracted pod-like or berry-like divisions at first completely concealing the sporangia, and at last, when dry and indurated, cracking open and allowing the spores to escape. Sterile fronds foliaceous. Rootstocks creeping and constantly forming new plants. (Name apparently from ὄνος, *a vessel,* and κλείω, *to close,* from the singularly rolled up fructification.)

§ 1. ONOCLEA proper. *Sterile frond with anastomosing veins.*

1. **O. sensíbilis,** L. (SENSITIVE FERN.) (Pl. 19, fig. 1, 2.) Fronds scattered; the sterile ones long-stalked (2 – 15′ long), triangular-ovate, pinnatifid into a few oblong-lanceolate sinuately lobed or nearly entire segments; veins reticulated with fine meshes; fertile fronds contracted, closely bipinnate, the pinnules rolled up into berry-like bodies. — Moist meadows and thickets, very common and variable. July. — Imperfectly fertile fronds sometimes occur, with the still foliaceous pinnæ cut into obovate segments with free veins and abortive sori; the so-called var. OBTUSILOBÀTA.

§ 2. STRUTHIÓPTERIS. *Sterile frond with free veins.*

2. **O. Struthiópteris,** Hoffmann. (Pl. 16, fig. 1 – 5.) Fronds growing in a crown; sterile ones short-stalked (2 – 10′ high), broadly lanceolate, narrowed toward the base, pinnate with many linear-lanceolate, pinnatifid pinnæ; veins free, the veinlets simple; fertile frond shorter, pinnate with pod-like or somewhat necklace-shaped pinnæ. (Struthiopteris Germanica, *Willd.*) — Alluvial soil, common northward. July. — The rootstock sends out slender underground stolons, which bear fronds the next year. (Eu.)

### 16. WOÓDSIA, R. Brown. (Pl. 19.)

Fruit-dots round, borne on the back of simply-forked free veins; the very thin and often evanescent indusium attached by its base all around the receptacle, *under* the sporangia, either small and open, or else early bursting at the top into irregular pieces or lobes. — Small and tufted pinnately-divided ferns. (Dedicated to *Joseph Woods,* an English botanist.)

* *Stalks obscurely articulated some distance from the base; fronds chaffy or smooth, never glandular; indusium divided nearly to the centre into slender hairs which are curled over the sporangia.*

1. **W. Ilvénsis,** R. Brown. *Frond oblong-lanceolate* (2 – 6′ long by 12 – 18″ wide), smoothish and green above, *thickly clothed underneath as well as the stalk with rusty bristle-like chaff,* pinnate; the pinnæ crowded, oblong, obtuse, sessile, pinnately parted, *the numerous crowded segments oblong,* obtuse, obscurely crenate; the fruit-dots near the margin, somewhat confluent when old. — Exposed rocks; common, especially northward, and southward in the Alleghanies. June. (Eu.)

2. **W. hyperbòrea,** R. Brown. Frond narrowly oblong-lanceolate (2–6′ long by 8–12″ wide), smooth above, sparingly paleaceous-hirsute beneath, pinnate; the pinnæ triangular-ovate, obtuse, pinnately lobed, the lobes few and nearly entire; fruit-dots rarely confluent. — Mountain ravines, northern Vt. and N. Y., and northward; rare. (Eu.)

3. **W. glabélla,** R. Brown. (Pl. 19, fig. 1–3.) *Smooth and naked throughout; frond linear* and very delicate (2–5′ high), pinnate; *pinnæ roundish-ovate,* the lower ones rather remote (2–4″ long), obtuse, crenately lobed; fruit-dots scanty; the hairs of the indusium fewer than in the last two species. — On moist mossy rocks, mountains of northern New Eng., north and westward. First found at Little Falls, N. Y., by *Dr. Vasey.* (Eu.)

* * *Stalks not articulated; fronds never chaffy, often glandular-pubescent.*

+ *Indusium of a few broad segments, at first covering the sorus completely.*

4. **W. obtùsa,** Torr. (Pl. 19, fig. 4, 5.) Frond broadly lanceolate, minutely glandular-hairy (6–12′ high), pinnate, or nearly twice pinnate; pinnæ rather remote, triangular-ovate or oblong (1–2′ long), bluntish, pinnately parted; segments oblong, obtuse, crenately toothed, the lower pinnatifid with toothed lobes; veins forked, and bearing the fruit-dots on or below the minutely toothed lobes; indusium at length splitting into several spreading jagged lobes. — Rocky banks and cliffs; not rare.

+ + *Indusium entirely concealed beneath the sorus, divided into very narrow segments or reduced to minute hairs.*

5. **W. Oregàna,** D. C. Eaton. Smooth, with fronds (2–8′ high, 8–12″ wide) elliptical-lanceolate, pinnate, the fertile ones tallest; pinnæ triangular-oblong, obtuse, pinnatifid; segments oblong or ovate, obtuse, finely toothed, and in larger fronds incised; fruit-dots near the margin; indusium very small, divided almost to the centre into a few necklace-like-jointed cilia. — Crevices of rocks, south shore of Lake Superior (*Robbins*), and westward.

6. **W. scopulìna,** D. C. Eaton. Much like the last, but the rather larger fronds puberulent beneath with minute jointed hairs and stalked glands; indusium deeply cleft into narrow segments ending in jointed hairs. — Rocky places, Minn., southward and westward.

### 17. DICKSÒNIA, L'Her. (Pl. 18.)

Fruit-dots small, globular, marginal, each placed on the apex of a free vein or fork; the sporangia borne on an elevated globular receptacle, enclosed in a membranaceous cup-shaped indusium which is open at the top, and on the outer side partly adherent to a reflexed toothlet of the frond. (Named for *James Dickson,* an English Cryptogamic botanist.)

1. **D. pilosiúscula,** Willd. Fronds minutely glandular and hairy (2–3° high), ovate-lanceolate and acuminate in outline, pale green, very thin, with strong chaffless stalks rising from slender extensively creeping naked rootstocks, mostly bipinnate; primary pinnæ lanceolate, pointed, the secondary pinnatifid into oblong and obtuse cut-toothed lobes; fruit-dots minute, each on a recurved toothlet, usually one at the upper margin of each lobe. (D. punctilobula, *Kunze.*) — Common in moist and shady places, from New Eng. to Minn. — Frond sweet-scented in drying.

### 18. TRICHÓMANES, L. Filmy Fern.

Sporangia with a transverse entire ring, sessile on a cylindrical receptacle which is produced from the end of a vein and enclosed in a funnel-form or cup-shaped involucre of the same substance with the frond. Fronds very thin and pellucid, often consisting of a single layer of cells. (An ancient Greek name for some fern.)

1. **T. radìcans,** Swartz. Fronds very delicate, oblong-lanceolate in outline (4 – 8′ long, 6 – 18″ wide), bipinnatifid; rhachis narrowly winged; pinnæ triangular-ovate, the divisions toothed or again lobed; involucres tubular-funnel-shaped, margined, the mouth truncate; receptacle often much exserted. — On moist and dripping sandstone cliffs, Ky., and southward; rare. — Though the fronds are so very delicate, yet they survive for several years; they begin to fruit the second or third year, and thereafter the receptacle continues to grow and to produce new sporangia at its base. (Eu.)

### 19. SCHIZÆA, Smith. (Pl. 20.)

Sporangia large, ovoid, striate-rayed at the apex, opening by a longitudinal cleft, naked, vertically sessile in a double row along the single vein of the narrow divisions of the pinnate (or radiate) fertile appendages to the slender and simply linear, or (in foreign species) fan-shaped or dichotomously many-cleft fronds (whence the name, from σχίζω, *to split*).

1. **S. pusílla,** Pursh. Sterile fronds linear, very slender, flattened and tortuous; the fertile ones equally slender ($\frac{1}{4}$″ wide), but taller (3 – 4′ high), and bearing at the top the fertile appendage, consisting of about 5 pairs of crowded pinnæ (each 1 – 1$\frac{1}{2}$″ long). — Low grounds, pine barrens of N. J.; very local. Sept. (Also in Nova Scotia and Newf.)

### 20. LYGÒDIUM, Swartz. Climbing Fern. (Pl. 20.)

Fronds twining or climbing, bearing stalked and variously lobed (or compound) divisions in pairs, with mostly free veins; the fructification on separate contracted divisions or spike-like lobes, one side of which is covered with a double row of imbricated hooded scale-like indusia, fixed by a broad base to short oblique veinlets. Sporangia much as in Schizæa, but oblique, fixed to the veinlet by the inner side next the base, one or rarely two covered by each indusium. (Name from λυγώδης, *flexible.*)

1. **L. palmàtum,** Swartz. Very smooth; stalks slender, flexile and twining (1 – 3° long), from slender running rootstocks; the short alternate branches or petioles 2-forked; each fork bearing a round-heart-shaped palmately 4 – 7-lobed frondlet; fertile frondlets above, contracted and several times forked, forming a terminal panicle. — Low moist thickets and open woods, Mass. to Va., Ky., and sparingly southward; rare. Sept.

### 21. OSMÚNDA, L. Flowering Fern. (Pl. 20.)

Fertile fronds or fertile portions of the frond destitute of chlorophyll, very much contracted, and bearing on the margins of the narrow rhachis-like divisions short-pedicelled and naked sporangia; these are globular, thin and reticulated, large, opening by a longitudinal cleft into two valves, and bearing near the apex a small patch of thickened oblong cells, the rudiment of a transverse ring. — Fronds tall and upright, growing in large crowns from thickened rootstocks, once or twice pinnate; veins forking and free. Spores green. (*Osmunder*, a Saxon name of the Celtic divinity, Thor.)

* *Sterile fronds truly bipinnate.*

1. **O. regàlis,** L. (Flowering Fern.) Very smooth, pale green (2–5° high); sterile pinnules 13–25, varying from oblong-oval to lance-oblong, finely serrulate, especially toward the apex, otherwise entire, or crenately lobed toward the rounded, oblique and truncate, or even cordate and semi-auriculate base, sessile or short-stalked (1–2′ long); the fertile racemose-panicled at the summit of the frond. — Swamps and wet woods; common. The cordate pinnules sometimes found here are commoner in Europe. May, June. (Eu.)

* * *Sterile fronds once pinnate; pinnæ deeply pinnatifid; the lobes entire.*

2. **O. Claytoniàna,** L. (Pl. 20, fig. 1–3.) Clothed with loose wool when young, soon smooth; *fertile fronds taller than the sterile* (2–4° high); pinnæ oblong-lanceolate, with oblong obtuse divisions; *some* (2–5 *pairs*) *of the middle pinnæ fertile*, these entirely pinnate; sporangia greenish, turning brown. — Low grounds, common. May. — Fruiting as it unfolds.

3. **O. cinnamòmea,** L. (Cinnamon Fern.) Clothed with rusty wool when young; *sterile fronds tallest* (at length 3–5° high), smooth when full grown, the lanceolate pinnæ pinnatifid into broadly oblong obtuse divisions; *fertile fronds separate*, appearing earlier from the same rootstock and soon withering (1–2° high), contracted, twice pinnate, covered with the cinnamon-colored sporangia. — Var. frondòsa is a rare occasional state, in which some of the fronds are sterile below and more sparsely fertile at their summit, or rarely in the middle. — Swamps and low copses, everywhere. May.

## Order 132. OPHIOGLOSSÀCEÆ. (Adder's-Tongue Family.)

Leafy and often somewhat fleshy plants; the leaves (*fronds*) simple or branched, often fern-like in appearance, erect in vernation, developed from underground buds formed either inside the base of the old stalk or by the side of it, and bearing in special spikes or panicles rather large subcoriaceous bivalvular sporangia formed from the main tissue of the fruiting branches. Prothallus underground, not green, monœcious. — A small order, separated from Ferns on account of the different nature of the sporangia, the erect vernation, etc.

1. **Botrychium.** Sporangia in pinnate or compound spikes, distinct. Veins free.
2. **Ophioglossum.** Sporangia cohering in a simple spike. Veins reticulated.

### 1. BOTRÝCHIUM, Swartz. Moonwort. (Pl. 20.)

Rootstock very short, erect, with clustered fleshy roots (which are full of starch, in very minute, irregular granules!); the base of the naked stalk containing the bud for the next year's frond; frond with an anterior fertile and a posterior sterile segment; the former mostly 1–3-pinnate, the contracted divisions bearing a double row of sessile naked sporangia; these are distinct, rather coriaceous, not reticulated, globular, without a ring, and open transversely into two valves. Sterile segment of the frond ternately or pinnately divided or compound; veins all free. Spores copious, sulphur-color. (Name a diminutive of *βότρυς, a cluster of grapes,* from the appearance of the fructification.)

§ 1. BOTRYCHIUM proper. *Base of the stalk containing the bud completely closed; sterile segment more or less fleshy; the cells of the epidermis straight.*

* *Sterile portion of the frond sessile or nearly so at or above the middle of the plant. Plants small.*

1. **B. Lunària,** Swartz. *Sterile segment* nearly sessile, borne near the middle of the plant, *oblong, simply pinnate with* 5 – 15 *lunate or fan-shaped* very obtuse crenate, incised or nearly entire, *fleshy divisions,* more or less excised at the base on the lower or on both sides, the veins radiating from the base and repeatedly forking; fertile segment panicled, 2 – 3-pinnate. — N. Eng. to Lake Superior, and northward; rare. — Very fleshy, 4 – 10′ high. (Eu.)

2. **B. símplex,** Hitchcock. Fronds small (2 – 4′, rarely 5 – 6′ high), *the sterile segment short-petioled from near the middle of the plant, thickish* and fleshy, simple and roundish, or *pinnately* 3 – 7*-lobed;* the lobes roundish-obovate, nearly entire, decurrent on the broad and flat indeterminate rhachis; *the veins all forking from the base;* fertile segment simple or 1 – 2-pinnate. — Maine to N. Y., Minn., and northward; rare. (Eu.)

3. **B. lanceolàtum,** Angstroem. Fronds small (3 – 10′ high); *the sterile segment closely sessile at the top of the* long and slender common *stalk,* scarcely fleshy, *triangular, ternately twice pinnatifid; the acute lobes* lanceolate, incised or toothed; veinlets forking from a *continuous midvein;* fertile part 2 – 3-pinnate. — N. Eng. and N. J. to Ohio and Lake Superior. July – Aug. (Eu.)

4. **B. matricariæfòlium,** Braun. Fronds small (3 – 10′ high); *the sterile segment nearly sessile at the top of the* long and slender *common stalk,* moderately fleshy, *ovate or triangular,* varying from pinnate to bipinnatifid; *the lobes oblong-ovate and obtuse; midvein dissipated* into forking veinlets; fertile part 2 – 3.pinnate. — Same range as the last. June, July. (Eu.)

* * *Sterile portion of the frond long-stalked; the common stalk short in proportion to the size of the plant. Plants usually larger.*

5. **B. ternàtum,** Swartz. (Pl. 20.) *Plant very fleshy* (4 – 16′ high), sparsely hairy; *sterile segment long-petioled* from near the base of the plant, broadly triangular, *ternate and variously decompound with stalked divisions;* ultimate segments varying from roundish-reniform and sub-entire to ovate-lanceolate and doubly incised; fertile segment erect, 2 – 4-pinnate. — The following varieties pass into each other: — Var. AUSTRÀLE; frond ample; ultimate segments rhomboid-ovate with a denticulate margin. — Var. INTERMÈDIUM; frond of moderate size; ultimate segments as in var. australe. (B. lunarioides, of last ed.) — Var. RUTÆFÒLIUM; frond small; ultimate segments few, ovate and semicordate. — Var. LUNARIOÌDES; frond small; ultimate segments roundish-reniform. — Var. OBLÌQUUM; frond moderate; ultimate segments obliquely lanceolate, denticulate or toothed. — Var. DISSÉCTUM; segments dissected into innumerable narrow lobes or teeth. — Pastures and hillsides, sometimes in dry woods, rather common, especially vars. intermedium and obliquum. — Var. rutæfolium occurs in Europe.

§ 2. OSMUNDÓPTERIS. *Base of the stalk containing the bud open along one side; sterile segment membranaceous; the cells of the epidermis flexuous.*

6. **B. Virginiànum,** Swartz. *Fronds tall and ample; sterile segment sessile above the middle of the plant,* broadly triangular, thin and membranaceous, *ternate;* the short-stalked *primary divisions once or twice pinnate,* and then once or twice pinnatifid; the oblong lobes cut-toothed toward the apex; *veins forking from a midvein;* fertile part 2–3-pinnate. — Rich woods; common. — Plant 1–2° high, or often reduced to a few inches, in which case it is B. gracile, *Pursh.* June, July. (Eu.)

### 2. OPHIOGLÓSSUM, L. ADDER'S-TONGUE. (Pl. 20.)

Rootstock erect, fleshy and sometimes tuberous, with slender fleshy roots which are sometimes proliferous; bud placed by the side of the base of the stalk; fronds with anterior and posterior segments as in Botrychium, but the coriaceous sporangia connate and coherent in two ranks on the edges of a simple spike. Sterile segment fleshy, simple in our species; the veins reticulated. Spores copious, sulphur-yellow. (Name from *ὄφις, a serpent,* and *γλῶσσα, tongue.*)

1. **O. vulgàtum,** L. Fronds from a slender rootstock (2–12′ high), mostly solitary; sterile segment sessile near the middle of the plant, ovate or elliptical (1–3′ long); midvein indistinct or none; veins forming small meshes enclosed in larger ones. — Bogs and pastures; not common. July. (Eu.)

## ORDER 133. LYCOPODIÀCEÆ. (CLUB-MOSS FAMILY.)

Low plants, usually of moss-like aspect, with elongated and often much branched stems covered with small lanceolate or subulate, rarely oblong or rounded, persistent entire leaves; the sporangia 1–3-celled, solitary in the axils of the leaves, or on their upper surface, when ripe opening into two or three valves, and shedding the numerous yellow spores, which are all of one kind. — The Order, as here defined, consists mainly of the large genus

### 1. LYCOPÒDIUM, L. CLUB-MOSS. (Pl. 21.)

Spore-cases coriaceous, flattened, usually kidney-shaped, 1-celled, 2-valved, mostly by a transverse line round the margin, discharging the subtile spores in the form of a copious sulphur-colored inflammable powder. — Perennials, with evergreen one-nerved leaves, imbricated or crowded in 4–16 ranks. (Name compounded of *λύκος, a wolf,* and *πούς, foot,* from no obvious resemblance.)

§ 1. *Spore-cases in the axils of the ordinary (dark green and shining, rigid, lanceolate, about 8-ranked) leaves.*

1. **L. Selàgo,** L. Stems erect and rigid, dichotomous, forming a level-topped cluster (3–6′ high); *leaves uniform,* crowded, ascending, glossy, pointed, entire or denticulate; sporangia in the axils of unaltered leaves. — Mountain-tops, Maine to Lake Superior, and northward. — The leaves of this and the next species often bear little gemmæ, with the lower bracts pointed, and the 2–3 uppermost broadly obovate and fleshy, as figured in 1768 by Dillenius. These gemmæ fall to the ground and their axis grows into the stem of a new plant,

as specimens collected in 1854 show very plainly. (For their true nature see Sachs' Lehrbuch, Engl. trans., p. 411.)

2. **L. lucídulum,** Michx. Stems assurgent, less rigid, dichotomous (6 – 12′ long); leaves pointed, toothed, at first spreading, then deflexed, arranged in alternate zones of shorter and longer leaves, the shorter leaves more frequently bearing sporangia in their axils; proliferous gemmæ usually abundant. — Cold, damp woods; common northward. Aug.

§ 2. *Spore-cases only in the axils of the upper* (*bracteal*) *leaves, thus forming a spike.*

∗ *Leaves of the creeping sterile and of the upright fertile stems or branches and those of the simple spike nearly alike, many-ranked.*

3. **L. inundàtum,** L. *Dwarf;* creeping sterile stems forking, flaccid; the fertile solitary (1 – 4′ high), bearing a short thick spike; *leaves lanceolate or lance-awl-shaped, acute,* soft, spreading, *mostly entire,* those of the prostrate stems curving upward. — Var. Bigelòvii, Tuckerm., has fertile stems 5 – 7′ high, its leaves more awl-shaped and pointed, sparser and more upright, often somewhat teeth-bearing. — Sandy bogs, northward, not common; the var., eastern New Eng. to N. J., and southward. Aug. (Eu.)

4. **L. alopecuroìdes,** L. *Stems stout,* very densely leafy throughout; the sterile branches recurved-procumbent and creeping; the fertile of the same thickness, 6 – 20′ high; *leaves narrowly linear-awl-shaped, spinulose-pointed, spreading, conspicuously bristle-toothed below the middle; those of the cylindrical spike with long setaceous tips.* — Pine-barren swamps, N. J. to Va., and southward. Aug., Sept. — Stems, including the dense leaves, ½′ thick; the comose spike, with its longer spreading leaves, ¾ – 1′ thick.

∗ ∗ *Leaves* (*bracts*) *of the catkin-like spike scale-like, imbricated, yellowish, ovate or heart-shaped, very different from those of the sterile stems and branches.*

+– *Spikes sessile* (*i. e. branches equally leafy to the top*), *single.*

5. **L. annótinum,** L. Much branched; *stems prostrate and creeping* (1 – 4° long); *the ascending branches similar* (5 – 8′ high), sparingly forked; the sterile ones making yearly growths from the summit; *leaves equal, spreading,* in about 5 ranks, rigid, lanceolate, pointed, minutely serrulate (pale green); spike solitary, oblong-cylindrical, thick. — Var. púngens, Spring, is a reduced sub-alpine or mountain form, with shorter and more rigid-pointed erectish leaves. — Woods; common northward; the var. on the White Mountains, with intermediate forms around the base. July. (Eu.)

6. **L. obscùrum,** L. Rootstock cord-like, subterranean, bearing scattered, erect, tree-like stems dividing at the summit into several densely dichotomous spreading branches; leaves linear-lanceolate, decurrent, entire, acute, 6-ranked, those of the two upper and two lower ranks smaller and appressed, the lateral ones incurved-spreading; spikes 1 – 10, erect, mostly sessile; bracts scarious-margined, broadly ovate, abruptly apiculate. — Var. dendroídeum (L. dendroideum, *Michx.*) has all the leaves alike and incurved spreading. — Moist woods. Aug. — Remarkable for its tree-like appearance.

**L.** alpìnum, L., or its var. sabinæfòlium, occurs from Labrador to Washington Territory, and is to be expected in northern Maine and Minn. It has slender branches with rigid nearly appressed leaves.

+ + *Spikes peduncled, i. e. the leaves minute on the fertile branches.*

++ *Leaves homogeneous and equal, many-ranked; stems terete.*

7. **L. clavàtum,** L. (Common Club-Moss.) Stems creeping extensively, with similar ascending short and very leafy branches; the fertile terminated by a slender peduncle (4 – 6′ long), bearing about 2 – 3 (rarely 1 or 4) linear-cylindrical spikes; leaves linear-awl-shaped, incurved-spreading (light green), tipped, as also the bracts, with a fine bristle. — Dry woods; common, especially northward. July. (Eu.)

++ ++ *Leaves of two forms, few-ranked; stems or branches flattened.*

8. **L. Caroliniànum,** L. (Pl. 21.) Sterile stems and their few short branches *entirely creeping* (leafless and rooting on the under side), thickly clothed with broadly lanceolate acute and somewhat oblique 1-nerved *lateral leaves widely spreading in 2 ranks*, and a shorter intermediate row appressed on the upper side; also sending up a slender simple peduncle (2 – 4′ high, clothed merely with small bract-like and appressed awl-shaped leaves), *bearing a single cylindrical spike.* — Wet pine-barrens, N. J. to Va., and southward.

9. **L. complanàtum,** L. (Ground-Pine.) Stems extensively creeping (often subterranean), the erect or *ascending branches several times forked above;* bushy *branchlets crowded, flattened,* fan-like and spreading, *all clothed with minute imbricated-appressed awl-shaped leaves in 4 ranks,* with decurrent-united bases, the lateral rows with somewhat spreading tooth-like tips, those of the upper and under rows smaller, narrower, wholly appressed; peduncle slender, *bearing 2 – 4 cylindrical spikes.* — Var. Chamæcyparíssus has narrower, more erect and bushy branches, and the leaves less distinctly dimorphous. — Woods and thickets; common, especially northward. (Eu.)

## Order 134. SELAGINELLÀCEÆ.

Leafy plants, terrestrial or rooted in mud, never very large; the stems branching or short and corm-like; the leaves small and 4 – 6-rowed, or subulate and elongated; sporangia one-celled, solitary, axillary or borne on the upper surface of the leaf at its base and enwrapped in its margins, some containing large spores (*macrospores*) and others small spores (*microspores*). The macrospores are in the shape of a low triangular pyramid with a hemispherical base, and marked with elevated ribs along the angles. In germination they develop a minute prothallus which bears archegonia to be fertilized by antherozoids developed from the microspores.

1. **Selaginella.** Terrestrial; stems slender; leaves small; sporangia minute and axillary.
2. **Isoetes.** Aquatic or growing in mud; stems corm-like; leaves elongated and rush-like; sporangia very large, enwrapped by the dilated bases of the leaves.

### 1. SELAGINÉLLA, Beauv. (Pl. 21.)

Fructification of two kinds, namely, of minute and oblong or globular spore-cases, containing reddish or orange-colored powdery microspores; and of mostly 2-valved tumid larger ones, filled by 3 or 4 (rarely 1 – 6) much larger globose-angular macrospores; the former usually in the upper and the latter in the lower axils of the leafy 4-ranked sessile spike, but sometimes the two kinds are on opposite sides all along the spike. (Name a diminutive of *Selago*, an ancient name of a Lycopodium, from which this genus is separated, and which the plants greatly resemble in habit and foliage.)

* *Leaves all alike and uniformly imbricated; those of the spike similar.*

1. **S. spinòsa,** Beauv. *Sterile stems prostrate* or creeping, small and slender; *the fertile thicker, ascending, simple* (1–3′ high); *leaves lanceolate, acute, spreading, sparsely spinulose-ciliate.* (S. selaginoides, *Link.*) — Wet places, N. H. (*Pursh*), Mich., Lake Superior, Colorado, and northward; rare. — Leaves larger on the fertile stems, yellowish-green. (Eu.)

2. **S. rupéstris,** Spring. (Pl. 21, fig. 1–4.) *Much branched in close tufts* (1–3′ high); *leaves densely appressed-imbricated, linear-lanceolate,* convex and with a grooved keel, *minutely ciliate, bristle-tipped;* those of the strongly quadrangular spike rather broader. — Dry and exposed rocks; very common. — Grayish-green in aspect, resembling a rigid Moss. Very variable farther west and south. (Eu.)

* * *Leaves shorter above and below, stipule-like; the lateral larger, 2-ranked.*

3. **S. àpus,** Spring. Stems tufted and prostrate, creeping, much branched, flaccid; leaves pellucid-membranaceous, the larger spreading horizontally, ovate, oblique, mostly obtuse, the smaller appressed, taper-pointed; those of the short spikes nearly similar; larger spore-cases copious at the lower part of the spike. — Low, shady places; not rare, especially southward. — A delicate little plant, resembling a Moss or Jungermannia.

## 2. ISÒETES, L. Quillwort. (Pl. 21.)

Stem or trunk a fleshy more or less depressed corm, rooting just above its 2-lobed (or in many foreign species 3-lobed) base, above covered with the dilated and imbricated bases of the awl-shaped or linear somewhat quadrangular leaves, which include four air-tubes, intercepted by cross partitions. Sporangia pretty large, orbicular or ovoid, plano-convex, very thin, sessile in the axils of the leaves, and united at the back with their excavated bases (the thin edges of the excavation folding round partly cover them, forming the *velum*), traversed internally by transverse threads; those of the outer leaves filled with large spherical macrospores, their whitish crustaceous integument marked by one circular, and on the upper surface by three radiating elevated lines (circumscribing a lower hemisphere, and three upper segments which open valve-like in germination); those of the inner leaves filled with very minute and powdery grayish microspores; these are always obliquely oblong and triangular. — Mostly small aquatics, grass-like or rush-like in aspect, some always submerged, others amphibious, a few living in merely moist soil, maturing their fruit in late summer and early autumn, except n. 7 and some forms of n. 6.

This genus is left essentially as it was elaborated for the 5th edition by the late Dr. George Engelmann. The present editor has added to the range of a few species, and given var. robusta of n. 3.

* *Growing under water, only accidentally or in very dry seasons out of water; leaves without stomata* (*except in forms of* n. 3) *and peripherical bast-bundles.*

1. **I. lacústris,** L. (Pl. 21, fig. 1–5.) Leaves (10–25 in number, 2–6′ long) dark green, rigid; sporangium ovoid or circular, the upper third, or less,

covered by the velum, the free part pale and unspotted; both kinds of spores the largest of our species; macrospores (0.32 – 0.38″ wide) covered with short and twisted crested ridges, which often anastomose; microspores (0.017 – 0.020″ long) smooth. — Mountain lakes, Penn., N. Y., and New Eng. to Lake Superior, and northward, often with n. 3. (Eu.)

2. **I. Tuckermàni,** Braun. Leaves (10 – 30, 2 – 3′ long) very slender, awl-shaped, olive-green, the outer recurved; sporangium ovoid or circular, the upper third covered by the velum, the free part sometimes brownish-spotted; macrospores (0.22 – 0.28″ wide) on the upper segments covered with parallel and anastomosing ridges, the lower half reticulated; microspores (0.013 – 0.015″ long) smooth or very delicately papillose. — Mystic and other ponds near Boston, together with the next (*Tuckerman*, *W. Boott*).

3. **I. echinóspora,** Durieu. Leaves slender, awl-shaped; sporangium ovoid or circular; macrospores (0.20 – 0.25″ wide) beset all over with small entire and obtuse or slightly forked spinules. (Eu.) — In this European form, the leaves are very slenderly attenuated (3 – 4′ long), the upper margin of the sporangium only is covered with the narrow velum, the free part is unspotted, and the slightly papillose microspores are larger (0.015 – 0.016″ long).

Var. **Braùnii,** Engelm. Leaves (15 – 30 in number, 3 – 6′ long) dark and often olive-green, straight or commonly recurved, half or two thirds of the sporangium covered by the velum, the free part often with light brown spots; macrospores as in the type; microspores smaller (0.013 – 0.014″ long), smooth. (I. Braunii, *Durieu.*) — Ponds and lakes, New Eng. to N. Y., Penn., Mich., and northward, often with the two preceding. — Frequently with a few stomata, especially in Niagara specimens.

Var. **robústa,** Engelm. Stouter; leaves (25 – 70, 5 – 8′ long) with abundant stomata all over their surface; velum covering about one half of the large spotted sporangium; macrospores 0.18 – 0.27″ wide. — Lake Champlain, north end of Isle La Motte (*Pringle*).

Var. **muricàta,** Engelm. Leaves (15 – 30, 6 – 10′ long) straight or flaccid, bright green; about one half of the almost circular sporangium covered by the velum, unspotted; macrospores (0.22 – 0.27″ wide) with shorter and blunter spinules; microspores as in the last variety, or rarely spinulose. (I. muricata, *Durieu.*) — In some ponds north of Boston (*W. Boott*).

Var. **Boóttii,** Engelm. Leaves (12 – 20, 4 – 5′ high) awl-shaped, stiffly erect, bright green, with stomata; sporangium as in the last; macrospores as in the type, but a little smaller and with very slender spinules. (I. Boottii, *Braun*, in litt.) — Pond in Woburn, near Boston, partly out of water (*W. Boott*).

* * *Growing partly out of water, either by the pond drying up or by the receding of the ebb tide; leaves with stomata, and in* n. 6 *and* 7 *with four or more peripherical bast-bundles.*

4. **I. saccharàta,** Engelm. Leaves (10 – 15, 2 – 3′ long) slender, olive-green, curved; sporangium small, ovoid, only the upper edge covered by the velum, nearly unspotted; macrospores (0.20 – 0.22″ wide) minutely tuberculate; microspores (0.012″ long) papillose. — On Wicomico and Nanticoke Rivers, eastern shore of Maryland, between high and low tide (*Canby*).

5. **I. ripària,** Engelm. Leaves (15 – 30, 4 – 8′ long) slender, deep green, erect; sporangium mostly oblong, upper margin to one third covered by the

velum, the free part spotted; macrospores very variable in size (0.22 – 0.30″ wide), the upper segments covered by short crested ridges, which on the lower hemisphere run together forming a network; microspores larger than in any other species except n. 1 (0.013 – 0.016″ long), mostly somewhat tuberculated. — Gravelly banks of the Delaware, from above Philadelphia to Wilmington, between flood and ebb tide; margins of ponds, Lake Saltonstall, Conn. (*Setchell*), and northward. — Distinguished from the nearly allied I. lacustris by the stomata of the leaves, the spotted sporangium, the smaller size of the macrospores and their reticulation on the lower half.

6. **I. Engelmánni,** Braun. Leaves long (25 – 100, 9 – 20′ long), light green, erect or at last prostrate, flat on the upper side; sporangium mostly oblong, unspotted, the velum very narrow; macrospores (0.19 – 0.24″ wide) covered all over with a coarse honeycomb-like network; microspores (0.012 – 0.014″ long) mostly smooth. — Shallow ponds and ditches, from Mass. (near Boston, *W. Boott, H. Mann*) and Meriden, Conn. (*F. W. Hall*), to Penn. and Del. and (probably through the Middle States) to Mo. — By far the largest of our species, often mature in July.

Var. **grácilis,** Engelm. Leaves few (8 – 12 only, 9 – 12′ long) and very slender; both kinds of spores nearly as in the type. — Southern New Eng. (Westville, Conn., *Setchell*) and N. J. (*Ennis*); entirely submersed!

Var. **válida,** Engelm. Trunk large and stout (often 1 – 2′ wide); leaves (50 – 100, even 200, 18 – 25′ long) with an elevated ridge on the upper side; sporangium oblong or linear-oblong (4 – 9″ long), ⅓ – ½ or more covered by the velum; spores very small; macrospores 0.16 – 0.22″ wide; microspores 0.011 – 0.013″ long, spinulose. — Del. (*Canby*) and Penn. (*Porter*). Sept.

7. **I. melanópoda,** J. Gay. Leaves (15 – 50, 6 – 10′ long) very slender, keeled on the back, straight, bright green, usually with dark brown or black shining bases; sporangium mostly oblong, with a very narrow velum, brown or spotted; macrospores very small (0.14 – 0.18″ wide), smoothish, or with faint tubercles or ridges; microspores (0.010 – 0.012″ long) spinulose. — Shallow ponds, and wet prairies and fields, central and northern Ill. (*E. Hall, Vasey*), and westward. June, and sometimes again in Nov. — Trunk more spherical and more deeply 2-lobed, and both kinds of spores smaller than in any other of our species; leaves disappearing during the summer heat. Closely approaching the completely terrestrial species of the Mediterranean region.

## ORDER 135. MARSILIÀCEÆ.

Perennial plants rooted in mud, having a slender creeping rhizome and either filiform or 4-parted long-petioled leaves; the somewhat crustaceous several-celled sporocarps borne on peduncles which rise from the rhizome near the leaf-stalks, or are more or less consolidated with the latter, and contain both macrospores and microspores.

### 1. MARSÌLIA, L. (Pl. 25.)

Submersed or emersed aquatic plants, with slender creeping rootstocks, sending up elongated petioles, which bear at the apex a whorl of four nervose-veined leaflets, and at or near their base, or sometimes on the rootstock, one or more ovoid sporocarps. These sporocarps or fruit usually have two teeth near the base, and are 2-celled vertically, with many transverse partitions, and split or burst into 2 valves at maturity. The sporocarps have a ring along the edges of the valves, which at length swells up and bears the sausage-shaped compartments from their places. The compartments contain macrosporangia and microsporangia intermixed. (Named for *Aloysius Marsili*, an early Italian naturalist.)

1. **M. quadrifòlia,** L. Leaflets broadly obovate-cuneate, glabrous; sporocarps usually 2 or 3 on a short peduncle from near the base of the petioles, pedicelled, glabrous or somewhat hairy, the basal teeth small, obtuse, or the upper one acute. — In water, the leaflets commonly floating on the surface; Bantam Lake, Litchfield, Conn., and now introduced in many places. (Eu.)

2. **M. vestìta,** Hook. & Grev. Leaflets broadly cuneate, usually hairy, entire (2-7″ long and broad); petioles 1-4′ long; peduncles free from the petiole; sporocarps solitary, short-peduncled (about 2″ long), very hairy when young; upper basal tooth of sporocarp longest, acute, straight or curved, lower tooth acute, the sinus between them rounded. (M. mucronata, *Braun.*) — In swamps which become dry in summer; Iowa and southwestward.

## ORDER 136. SALVINIÀCEÆ.

Floating plants of small size, having a more or less elongated and sometimes branching axis, bearing apparently distichous leaves; sporocarps or conceptacles very soft and thin-walled, two or more on a common stalk, one-celled and having a central, often branched receptacle which bears either macrosporangia containing solitary macrospores, or microsporangia with numerous microspores.

### 1. AZÓLLA, Lam. (Pl. 21.)

Small moss-like plants, the stems pinnately branched, covered with minute 2-lobed imbricated leaves, and emitting rootlets on the under side. Conceptacles in pairs beneath the stem; the smaller ones acorn-shaped, containing at the base a single macrospore with a few corpuscles of unknown character above it; the larger ones globose, and having a basal placenta which bears many pedicellate microsporangia which contain masses of microspores.

1. **A. Caroliniàna,** Willd. Plants somewhat deltoid in outline (4-12″ broad), much branched; leaves with ovate lobes, the lower lobe reddish, the upper one green with a reddish border; macrospores with three attendant corpuscles, its surface minutely granulate; masses of microspores glochidiate. — Floating on quiet waters, from Lake Ontario westward and southward, — appearing like a reddish hepatic moss.

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SALVÍNIA NÀTANS, L., was said by Pursh to grow floating on the surface of small lakes in Western New York, and has more recently been said to occur in Missouri. It has oblong-oval floating leaves 4-6″ long, closely pinnately-veined, which bear conceptacles and branching plumose fibres on their under surface.

## SUBCLASS II. CELLULAR ACROGENS, OR BRYOPHYTES.

Plants composed of cellular tissue only. Antheridia or archegonia, or both, formed upon the stem or branches of the plant itself, which is developed from the germinating spore usually with the intervention of a filiform or conferva-like prothallus. — Divided into the *Musci,* or Mosses, and the *Hepaticæ.*

### DIVISION I. HEPÁTICÆ.[1] (LIVERWORTS.)

Plants usually procumbent, consisting of a simple thallus, a thalloid stem, or a leafy axis; leaves when present 2-ranked, with uniform leaf-cells and no midvein; thalloid forms with or without a midvein, smooth or scurfy or scaly beneath and usually with numerous rootlets. Sexual reproduction by antheridia and archegonia, which are immersed in the thallus, or sessile or pedicelled upon it, or borne on a peduncled receptacle. The fertilized archegonium develops into a capsule (*sporogonium*) closely invested by a calyptra, which ruptures above as the ripened capsule (containing numerous spores and usually elaters) pushes upward. It is also commonly surrounded by a usually double involucre, the inner (often called *perianth*) more or less tubular, the outer tubular or more often foliaceous, sometimes wholly wanting. Propagation is also effected by offshoots (*innovations*), runners (*flagella*), or by *gemmæ,* which appear at the margin of the leaves or on the surface of the thallus, often in special receptacles.

### ORDER 137. **JUNGERMANNIÀCEÆ.** SCALE-MOSSES.

Plant-body a leafy axis or rarely thallose. Capsule borne on a slender often elongated pedicel, splitting at maturity into 4 valves. Elaters mixed with the spores, mostly bispiral (unispiral in n. 1 – 3, 32, and 33, 1 – 3-spiral in n. 5 and 28). Antheridia and archegonia diœcious or monœcious, in the latter case either mingled in the same inflorescence, or separated upon the same branch, with the antheridia naked in the axils of the lower leaves, or on separate parts of the same plant. Leaves

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[1] Elaborated for this edition by Prof. L. M. UNDERWOOD, of Syracuse, N. Y.

2-ranked, incubous (i. e. the apex of each leaf lying on the base of the next above), or succubous (i. e. the apex of each leaf lying under the base of the next above), or sometimes transverse, with frequently a third row of rudimentary leaves beneath the stem.

### Artificial Key to the Genera.

§ 1. Plant-body a leafy axis.

* Leaves complicate-bilobed (i. e. folded together) or with a small basal lobe.

+- Lower lobe smaller than the upper.

++ Root-hairs borne on the stems or underleaves.

1. **Frullania.** Lower lobe mostly saccate, more or less remote from the stem. Branches intra-axillary, the leaves on either side free.
2. **Jubula.** Lower lobe saccate; branches lateral, a basal leaf borne partly on the stem, partly on the branch.
3. **Lejeunea.** Lower lobe incurved, more or less inflated.
5. **Porella.** Lower lobe ligulate. Perianth triangular, the third or odd angle ventral.

++ ++ Root-hairs rising from the lower lobes.

4. **Radula.** Perianth compressed. Underleaves none.

+- +- Upper lobe smaller than the lower, or the two somewhat equal.

++ Leaves succubous as to their lower lobes.

15. **Scapania.** Involucral leaves 2; perianth dorsally compressed, the mouth truncate, bilabiate, decurved.
16. **Diplophyllum.** Involucral leaves few; perianth erect, round, the mouth denticulate.

++ ++ Leaves transverse.

25. **Marsupella.** Perianth tubular or somewhat compressed. (Compare also Jungermannia § Sphenolobus.)

* * Leaves palmately 3-4- (or many-) cleft.

+- Divisions numerous, capillary. Plants large, usually in conspicuous mats.

6. **Ptilidium.** Leaves palmatifid with ciliate margins.
7. **Trichocolea.** Leaves setaceously multifid.

+- +- Leaves 3-4-cleft or parted; plants small, mostly inconspicuous.

10. **Lepidozia.** Leaf-divisions two cells wide or more.
11. **Blepharostoma.** Leaf-divisions only one cell wide.

* * * Leaves entire, emarginate, or 2-3-toothed or -lobed.

+- Leaves closely imbricate on short julaceous stems.

27. **Gymnomitrium.** Involucre double, the inner shorter.

+- +- Leaves deeply bilobed.

8. **Herberta.** Underleaves large. Perianth fusiform on an elongated branch.
12. **Cephalozia.** Underleaves mostly wanting; perianth mostly triangular on a short branch.

+- +- +- Leaves incubous, mostly plane or depressed.

9. **Bazzania.** Leaves mostly 2-3-toothed. Perianth fusiform on a short branch.
14. **Kantia.** Leaves mostly entire. Perianth fleshy, pendulous, subterranean.

+- +- +- +- Leaves succubous or transverse.

++ Underleaves entire or nearly so.

13. **Odontoschisma.** Involucral leaves numerous, small, incised, those of the stem rounded or retuse.
21. **Mylia.** Involucral leaves 2, connate at base. Large.
22. **Harpanthus.** Involucral leaves few, smaller than the semi-vertical emarginate stem-leaves. Small.

24. **Jungermannia.** Involucral leaves few, mostly larger than the entire or bidentate stem-leaves. Medium-sized or large.

↔ ↔ Underleaves 2–4-cleft, -parted, or -divided.

17. **Geocalyx.** Involucre fleshy, saccate, pendent. Leaves bidentate; underleaves 2-cleft.
18. **Lophocolea.** Fruit terminal on the main stem or a primary branch. Involucral leaves distinct.
19. **Chiloscyphus.** Fruit on a short lateral branch. Involucral leaves distinct. (See also Jungermannia.)

↔ ↔ ↔ Underleaves mostly wanting.

*a.* Leaves entire or barely retuse.

23. **Liochlæna.** Involucral leaves distinct, like those of the stem; perianth truncate-depressed at the apex.
26. **Nardia.** Involucral leaves connate at base and adnate to the perianth.

*b.* Leaves bidentate or bilobed, rarely 3-lobed.

12. **Cephalozia.** Branches all from beneath. Perianth on a short branch, mostly trigonal with the odd angle beneath.
24. **Jungermannia.** Simple or branching laterally. Perianth terminal, mostly laterally compressed.

*c.* Leaves mostly spinulose or dentate.

20. **Plagiochila.** Involucral leaves large; perianth laterally compressed.

§ 2. Plant-body pseudo-foliaceous with succubous leaf-like lobes.

28. **Fossombronia.** Perianth large, campanulate.

§ 3. Plant-body a thallus.

* Thallus with a distinct costa.

29. **Pallavicinia.** Thallus 3–6″ wide, mostly simple, the margins sinuate or undulate. Perianth tubular, at length dorsal.
30. **Blasia.** Thallus 3–6″ wide, lobed, dichotomous, or radiate, the margins pinnatifid-sinuate.
32. **Metzgeria.** Thallus narrow (1–2″), ciliate at the margins or on one or both sides.

* * Thallus with an inconspicuous costa or none.

33. **Aneura.** Thallus rather narrow, mostly palmately or pinnately lobed. Sporogonium rising from the under side near the margin.
31. **Pellia.** Thallus wider, mostly simple or forked. Sporogonium rising from the upper surface.

## 1. FRULLÀNIA, Raddi. (Pl. 24.)

Leaves incubous, complicate-bilobed, the lower lobe usually inflated, helmet- or club-shaped; underleaves bifid, rarely entire, with basal rootlets. Diœcious or monœcious. Fruit terminal on the branches. Involucral leaves 2 or 4, larger than the stem-leaves; perianth 3–4-angled, mucronate. Calyptra pyriform, fleshy. Capsule globose, the lower third solid. Elaters truncate at each end, unispiral, adherent to the valves. Spores large, reddish, minutely muricate. Antheridia most often on a short branch, globose-oblong or cylindric. Archegonia 2–4, long-styled. (Named for *Leonardo Frullani*, an Italian Minister of State.)

§ 1. TRACHYCÓLEA. *Perianth triangular in section, rough with tubercles or scales, or villous; lower leaf-lobe helmet-shaped, truncate at base.*

* *Lower leaf-lobe about three fourths the size of the upper.*

1. **F. Oakesiàna,** Aust. Stems widely branching; fertile branches short; leaves obliquely orbicular, loosely imbricate, the lower lobe rotund, contiguous to the stem; underleaves ovate-rotund or subobovate, little wider than the

stem, bifid; involucral leaves more or less connate, equally bilobed, the lobes entire, obtuse; perianth small, subobovate-pyriform, smooth or 1 – 7-nerved or alate both sides. — White Mts., on stunted spruce and birch trees.

* * *Lower leaf-lobe much smaller than the upper.*

+- *Underleaves scarcely wider than the stem, ovate, bifid, the divisions entire, acute; perianth 1-carinate or smooth, except in* n. 2; *stems creeping.*

2. **F. Virgínica,** Lehm. Stems short, irregularly branching; leaves crowded, ovate, entire, somewhat concave, the lower lobes sometimes expanded into a lanceolate lamina; underleaves round-ovate, bifid, twice the width of the stem; perianth compressed-pyriform, tuberculate, 2 – 4-carinate dorsally, 4-carinate ventrally. — On bark of trees, rarely on rocks; common.

3. **F. Eboracénsis,** Lehm. Branches clustered; leaves loose, imbricate on the branches, round-ovate, entire; perianth pyriform, slightly compressed and repand, smooth, obscurely carinate beneath and gibbous toward the apex. (F. saxatilis, *Lindenb.*) — On trees and rocks; common northward.

4. **F. Pennsylvánica,** Steph. Stems dichotomous; leaves imbricate, flat, ovate, mucronate or rarely obtuse, entire; lower lobe marginal, large, round-cucullate; underleaves broadly ovate, deeply parted, the divisions long-acuminate; diœcious; antheridial spikes on short lateral branches, elongated; lobes of the involucral leaves acuminate, much narrowed at base, and the large underleaves carinate-concave, deeply parted, their apiculate divisions entire or toothed. — Shaded rocks, Stony Creek, Carbon Co., Penn. (*Rau*). Known only from the original description.

5. **F. saxícola,** Aust. Stems numerous, widely branching; leaves orbicular, scarcely oblique, flat; lower lobe near the stem, small, or rarely larger and round-galeate; underleaves scarcely wider than the stem, subovate, bifid; perianth broadly oblong, bowl-shaped with very short mouth, papillose, abruptly broad-carinate beneath, 1 – many-nerved each side of the keel, 2-angled. — Sloping dry trap rocks, Closter, N. J. (*Austin*).

+- +- *Underleaves* 2 – 3 *times wider than the stem, round or subquadrate, bifid, the divisions blunt or truncate.*

++ *Leaves lax, rather distant; lower lobe mostly expanded, ovate-lanceolate.*

6. **F. æolòtis,** Nees. Procumbent, irregularly branched or subpinnate; leaves semi-vertical, subsquarrose, obliquely cordate, the lower lobe expanded; underleaves ovate, acutely bifid, the upper margin angular-dentate or entire; sporogonium unknown. — On trees and rocks, chiefly in mountain regions.

++ ++ *Leaves close-imbricate; lower lobe galeate, seldom expanded except on terminal leaves.*

7. **F. squarròsa,** Nees. Decumbent, pinnately branching, the short fertile branch lateral; leaves subvertical, suborbicular, obtuse, entire; lower lobe obovate-cucullate or galeate, subappressed; underleaves cordate or rounded, sinuate-subdentate, slightly bifid; perianth oblong, triquetrous, convex dorsally, strongly keeled ventrally. — On rocks and trees, N. Y. to Ohio, and southward; rather common.

8. **F. plàna,** Sulliv. Procumbent, widely branching or subpinnate; leaves orbicular, subimbricate; lower lobe very small, as broad as long, close to the stem; underleaves rather large, flat, rounded, slightly bifid; monœ-

cious; perianth oblong-oval or subobovate, triquetrous, dorsally sulcate, acutely keeled ventrally; antheridial spikes globose. — Shaded rocks, N. Y. and N. J. to E. Tenn.

9. **F. dilatàta,** Nees. Loosely and widely pinnate; leaves round, entire, opaque; lower lobe subrounded, cucullate, close to the stem; underleaves subquadrate, toothed at the anterior angles; involucral leaves with 2 or 3 entire lobes; perianth tuberculate, retuse. — Rocks and trunks of trees; rather common. (Eu.)

§ 2. THYOPSIÉLLA. *Perianth smooth; leaves semicordate at base (marked by a central moniliform row of cells, or sometimes in* n. 12 *by a few scattered large cells); lower lobe near the stem (except in* n. 11), *cylindric-saccate, mostly erect; underleaves round-oval, the margin entire, recurved; diœcious.*

* *Leaves orbicular.*

10. **F. Asagrayàna,** Mont. (Pl. 24.) Creeping, simply pinnate; leaves concave, obtuse, decurved; lower lobe oblong-clavate, emarginate at base; underleaves oblong, flat, 2-cleft, the sinus obtuse; involucral leaves unequally 2-cleft, the dorsal segment oblong, pointed, nearly entire, the ventral subulate; perianth pyriform, 3-sided, obtusely keeled beneath. (F. Grayana of authors.) — Rocks and bark of coniferous trees; frequent.

11. **F. Tamarísci,** Nees. Bipinnately branching, somewhat rigid; leaves obtuse, mucronately acute or subacuminate, decurved, entire; lower lobe distant from the stem, oval or oblong; underleaves quadrate-ovate or obovate, emarginate, the margin revolute; involucral leaves bifid, serrulate; perianth oblong, sulcate dorsally, obtusely keeled ventrally. — N. Eng. and southward; rare. (Eu.)

* * *Leaves oblong from a narrowed base.*

12. **F. fragilifòlia,** Tayl. Procumbent, subpinnate, the alternate flattened branches subremote; leaves subimbricate, ascending, recurved, entire; lower lobe oblong-galeate; underleaves round-obovate, flat, appressed, bifid, the margins entire or angled; perianth obovate-cordate, concave dorsally, keeled ventrally; involucral leaves subequally lobed, obtusely few-toothed. (F. polysticta, *Mont.* F. Sullivantiæ, *Aust.*) — On trees in a cedar swamp, Urbana, Ohio (*Sullivant*). (Eu.)

## 2. JÙBULA, Dumort. (Pl. 25.)

Characters nearly as in Frullania. Leaves large and flat, an axillary one at the base of each branch without a lower lobe. Calyptra turnip-shaped, abruptly globose above. Monœcious, with 2 antheridia in each leaf of a spike-like branch, and the archegonia mostly solitary. (Name from *juba,* a mane, alluding to the persistent elaters.)

1. **J. Hutchínsiæ,** Dumort., var. **Sullivántii,** Spruce. Subdichotomously branching; leaves dark olive-green, subimbricate, obliquely ovate, acute, entire or subrepand; lower lobe saccate, rather remote from the stem, not spurred as in the European form; underleaves roundish, serrate or entire; involucral leaves bifid, serrate; perianth triangular-obpyriform. (Frullania Hutchinsiæ, *Nees,* in part.) — Wet rocks, N. Eng. to S. C.; more common in the mountains.

### 3. LEJEÙNEA, Libert. (Pl. 24.)

Leaves decurrent at the folds, the lower lobe incurved and ventricose; underleaves usually present, entire or bifid. Archegonium with a slender persistent style, solitary on a usually very short branch; the perianth free from the involucral leaves, oval or oblong, terete or angular, variously carinate, cristate, or ciliate. Capsule globose, 4-cleft to the middle, the valves recurved. Spores large (40–50 μ broad), globose or oblong, tuberculate. Antheridia at the base of ordinary leaves or in the axils of the leaves of a spike-like branch. — Otherwise as Frullania. (Named for *A.-L.-S. Lejeune*, a French botanist.)

* *Underleaves entire.*

1. **L. clypeàta,** Sulliv. (Pl. 24.) Stems procumbent, somewhat pinnately branched, ¾–1′ long; leaves whitish-green, round-ovate, cellular-crenulate, deflexed; lower lobe flat, oblong-quadrate; underleaves round-quadrate; monœcious; involucral leaves larger than those of the stem, the perianth round-obovate, 2–3-carinate dorsally, 1-carinate ventrally, the keels rough. (L. calyculata, *Tayl.*) — On rocks and trees; common south and westward.

* * *Underleaves bifid; leaves entire.*

2. **L. serpyllifòlia,** Libert, var. **Americàna,** Lindb. Stems long, somewhat branching, pale, pellucid and fragile; leaves rather remote, flat, opening from a basilar sac, scarcely decurved, obliquely roundish-ovate, obtuse, often slightly repand; underleaves about half as large, round-oval with a broad obtuse sinus and acute lobes; monœcious; the obovate-clavate perianth on a lateral branch. (L. cavifolia, *Aust.*) — On cedars, etc., Catskill Mts. (*Cleve*), Belleville, Ont. (*Macoun*), and southward; rather common.

3. **L. lùcens,** Tayl. Whitish, filiform, pinnately branched; leaves remote, rarely subimbricate, obliquely ovate-triangular, rounded or obtuse, semi-cordate at base; lower lobe ovoid, acute or apiculate; underleaves ½ as large as the lateral, round-oval, deeply bifid, the lobes broad-subulate; diœcious; involucral leaves rather longer, with lanceolate lobes; perianth scarcely emersed, broadly pyriform, 5-carinate. (L. cucullata, *Sulliv.;* not *Nees.*) — Near Cincinnati; moist rocks, Alleghany Mts. and southward (*Sullivant*). Minute and flaccid.

* * * *Underleaves obsolete; leaves muriculate-denticulate.*

4. **L. calcàrea,** Libert. Very minute; stems slender, loosely branching; leaves ovate, falcate-decurved, sinuate-complicate at base; monœcious; involucral leaves bifid, the divisions entire; perianth on a very short lateral branch, pyriform-clavate, acutely 5-angled, the margin echinate-muriculate. (L. echinata, *Tayl.*) — On rocks and roots of trees; rather common. (Eu.)

### 4. RÁDULA, Dumort. (Pl. 24.)

Leaves large, complicate-bilobed, incubous; lower lobe small, bearing root-hairs; underleaves none. Diœcious, rarely monœcious. Fruit usually terminal. Involucral leaves 2, slightly smaller than the cauline, 2-lobed; perianth tubular, compressed or nearly terete, truncate, entire or crenate. Calyptra pyriform, persistent. Capsule oval-cylindric. Elaters slender, free. Spores large, globose, minutely tuberculate. Antheridia in the ventricose bases of spicate leaves. (*Radula*, a scraper or spatula, in allusion to the form of the perianth.)

* *Lower lobe subquadrate, barely incumbent on the stem.*

1. **R. complanàta,** Dumort. Creeping, widely subpinnately branching; leaves imbricate, spreading, rounded, the lower lobe obtuse or acute; monœcious; perianth obconic, compressed, the mouth entire, truncate; antheridia in the bases of 2 – 3 pairs of strongly imbricate tumid leaves. — On rocks and roots of trees; common. (Eu.)

2. **R. obcónica,** Sulliv. (Pl. 24.) Smaller, indeterminately branched; leaves somewhat remote, round-obovate, convex; monœcious; perianth clavate-obconic, obliquely truncate; antheridia axillary on short lateral branches rising near the terminal involucre. — On trees in cedar swamps, N. J. to Ohio.

* * *Lower lobe small, rounded, more or less transversely adnate.*

3. **R. tènax,** Lindb. Stems brownish-green, rigid, tenacious; leaves remote, scarcely decurrent, obliquely elliptic-ovate, opaque, the cells round and strongly chlorophyllose; diœcious; the antheridial spike lateral below the keel of a leaf, long, linear, somewhat obtuse. (R. pallens, *Sulliv.;* not *Gottsche.*) — On rotten trunks, in the Catskill Mts., and southward, especially in the mountains.

## 5. PORÉLLA, Dill. (Pl. 24.)

Leaves large, incubous, complicate-bilobed; lower lobe ligulate, suberect; underleaves similar, decurrent at base, the apex entire. Diœcious. Fruit on a short lateral branch. Involucral leaves usually 4, 2-lobed, the margin ciliate or denticulate; perianth somewhat oval, compressed, bilabiate, incised or entire. Calyptra globose, persistent. Capsule globose, reddish, short-stalked. Elaters very numerous, 2 – 3-spiral, free. Spores large, rough. Antheridia solitary in the saccate bases of leaves, crowded in short spikes. (Name a diminutive of *porus*, an opening.)

* *Leaves more or less remote; stems bipinnate.*

1. **P. pinnàta,** L. Stems irregularly pinnate, fastigiate at the ends; leaves scarcely incubous, ovate-oblong, the rounded apex sometimes slightly decurved; lower lobe minute, flat, oblong, obtuse, as long but not half as wide as the flat, entire, ovate-rectangular, scarcely decurrent underleaves. (Madotheca Porella, *Nees.*) — On rocks and trees subject to inundation; common. (Eu.)

* * *Leaves mostly closely imbricate; stems mostly simply pinnate* (*or bipinnate in* n. 2).

2. **P. platyphýlla,** Lindb. (Pl. 24.) Yellowish or fuscous-green; stems irregularly pinnate, often fastigiate at the ends; leaves obliquely ovate, more or less concave at base and the rounded upper margin curved upward and undulate, mostly entire; lower lobe obliquely ovate, the margin strongly recurved, with an acute tooth at base; underleaves semicircular, with strongly reflexed margins. (Madotheca platyphylla, *Dumort.*) — On rocks and trees; common eastward. (Eu.)

3. **P. Thùja,** Lindb. Fuscous-green or blackish, somewhat regularly pinnate; leaves convex, closely appressed, obliquely round-ovate, the rounded

apex decurved, more or less denticulate; lower lobe oblong, obtuse, with an acute tooth at base, longer but narrower than the quadrate underleaves, both with strongly recurved sparsely denticulate margins. (Madotheca Thuja, *Dumort.*) — On rocks and trees; more common westward. (Eu.)

4. **P. dentàta,** Lindb. Mostly fuscous-green, irregularly pinnate or subdichotomous; leaves more remote on the branches, obliquely round-ovate, the rounded summit slightly decurved, more or less denticulate; lower lobe decurrent, twisted, obliquely ovate, acute, with recurved undulate denticulate margin and a large acute tooth at base; underleaves twice as wide as the lower lobes, quadrate-oval, the undulate reflexed margin dentate, especially near the base. (Madotheca rivularis, *Nees.*) — Shaded rocks, Yellow Springs, Ohio (*Sullivant*). (Eu.)

5. **P. Sullivántii,** Underw. Stems strongly decurved at the ends in drying; leaves suberect, the straight ventral margin strongly involute toward the apex; cells large, punctate-stelliform; perianth broadly keeled beneath, the keel 2-angled. (Madotheca Sullivantii, *Aust.*) — Alleghany Mts. (*Sullivant*); rare.

## 6. PTILÍDIUM, Nees. (Pl. 24.)

Leaves incubous, complicate-bilobed, each lobe divided and lacerately ciliate; underleaves 4–5-lobed, ciliate. Diœcious. Fruit terminating short branches. Involucral leaves 2–4, 4-cleft; perianth terete, obovate, the mouth connivent, plicate, denticulate. Calyptra pyriform, coriaceous. Capsule ovate. Spores globose. Antheridia in the base of closely imbricated leaves. (Name a diminutive of *πτίλον, a feather,* from the fringed foliage.)

1. **P. ciliàre,** Nees. Stems crowded, subpinnate; fringes of the foliage long-setaceous. (Blepharozia ciliaris, *Dumort.*) — On rotten logs and stumps; common. (Eu.)

## 7. TRICHOCÓLEA, Dumort. (Pl. 24.)

Leaves succubous, 4–5-divided, and with the underleaves setaceously fringed. Diœcious. Fruit terminal, or axillary from the growth of innovations. Involucral leaves coalescent into an oblong truncate hairy tube, blended in our species with the calyptra; perianth none. Capsule oblong, its pedicel bulbous at base. Elaters free. Antheridia large, in the axils of leaves on terminal branches. (Name from *θρίξ, hair,* and *κολεός, a sheath,* from the hairy involucre.)

1. **T. tomentélla,** Dumort. Stems pinnately decompound, densely tufted, glaucous, 2–6′ long; leaves nearly uniform; underleaves subquadrate, as wide as the stem. — Among mosses in swamps; common. (Eu.)

**T.** Biddlecòmiæ, Aust., very imperfectly described from specimens collected in Urbana, Ohio, is said to be simply and rather distantly pinnate.

## 8. HERBÉRTA, S. F. Gray. (Pl. 24.)

Leaves large, incubous or nearly transverse, narrow, 3-ranked, the underleaves being scarcely smaller, cleft to or below the middle, the lobes acute. Diœcious. Fruit terminal on a long branch. Involucral leaves numerous, equitant; perianth ovate-subulate or narrowly fusiform, 3-angled, deeply 6–8-

lobed. Calyptra small, obovate, deeply trifid. Capsule large, globose. Elaters free. Spores large, muriculate. Antheridia in the bases of leaves of a short terminal spike. (Named for *William Herbert*, an English botanist.)

1. **H. adúnca,** S. F. Gray. Stems long and slender, erect, brownish, nearly simple; leaves and underleaves almost alike, curved and one-sided, the lobes lanceolate. (Sendtnera juniperina, *Sulliv.;* not *Nees.*) — On rocks, Greenwood Mts., N. J., Catskill Mts., N. Y., and probably northward. (Eu.)

### 9. BAZZÀNIA, S. F. Gray. (Pl. 24.)

Leaves incubous, oblique, decurved, mostly truncate-tridentate; underleaves wider than the stem, mostly 3–4-toothed or crenate. Diœcious. Fruit on a short branch from the axil of an underleaf. Involucral leaves much imbricate, concave, orbicular or ovate, incised at the apex; perianth ovate-subulate or fusiform, somewhat 3-keeled. Calyptra pyriform or cylindric-oblong. Capsule oblong. Antheridial spikes from the axils of underleaves. (Named for *M. Bazzani*, an Italian Professor of Anatomy.)

1. **B. trilobàta,** S. F. Gray. (Pl. 24.) Creeping, dichotomous, proliferous; leaves ovate, the broad apex acutely 3-toothed; underleaves roundish-quadrangular, spreading, 4–6-toothed above; perianth curved, cylindric, plicate at the narrow apex and 3-toothed. (Mastigobryum trilobatum, *Nees.* M. tridenticulatum, *Lindenb.*) — Ravines, wet woods and swamps; common and variable. (Eu.)

2. **B. defléxa,** Underw. Stems forked or alternately branched; leaves strongly deflexed, cordate-ovate or ovate-oblong, falcate, the upper margin arcuate, the narrow apex 2–3-toothed or entire; underleaves roundish-quadrate, the upper margin bifid, crenate, or entire; perianth cylindric, arcuate, plicate above and denticulate. (Mastigobryum deflexum, *Nees.*) — On rocks in the higher mountains eastward. (Eu.)

### 10. LEPIDÒZIA, Dumort. (Pl. 24.)

Leaves small, incubous, palmately 2–4-cleft or -parted; underleaves similar, often smaller. Diœcious or rarely monœcious. Fruit terminal on short branches from the under side of the stem. Involucral leaves small, appressed, concave, 2–4-cleft; perianth elongated, ovate-subulate or narrowly fusiform, obtusely triangular above, entire or denticulate. Calyptra included, pyriform or oblong. Capsule oblong-cylindric. Spores minute, smooth or roughish. Antheridia large, pedicelled, solitary in the axils of 2-cleft spicate leaves. (Name from λεπίς, *a scale*, and ὄζος, *a shoot*, for the scale-like foliage.)

1. **L. réptans,** Dumort. (Pl. 24.) Creeping, pinnately compound, the branches often flagellate; leaves decurved, subquadrate, 3–4-cleft; involucral leaves ovate, truncate, unequally 4-toothed; perianth incurved, dentate. — On the ground and rotten wood, N. J., and common northward. (Eu.)

2. **L. setàcea,** Mitt. Leaves deeply 2–3-cleft or -parted, incurved, the lobes subulate, formed of a somewhat double series of cells; underleaves similar; perianth ciliate. (Jungermannia setacea, *Web.*) — On the ground and rotten wood; common. Resembling the next in its leaves, but smaller and brownish. (Eu.)

## 11. BLEPHARÓSTOMA, Dumort. (Pl. 25.)

Leaves transverse or slightly incubous, 3–4-parted, the divisions capillary; underleaves smaller, mostly 2–3-parted. Diœcious or monœcious. Fruit terminal. Involucral leaves numerous, verticillate, deeply 4-cleft; perianth exserted, pyriform-cylindric, laciniate. Calyptra short, oblong, bilabiate. Capsule cylindric-oblong. Elaters large, very obtuse. Spores large, smooth. Antheridia solitary in the axils of leaf-like bracts. (Name from βλέφαρον, *an eyelid*, and στόμα, *mouth*, in allusion to the fringed orifice of the perianth.)

1. **B. trichophýllum,** Dumort. Flaccid, branched, creeping; leaf-divisions straight, spreading, each composed of a single row of cells; perianth ovate-cylindric. (Jungermannia trichophylla, *L.*) — On the ground and rotten wood. Minute, light green. (Eu.)

## 12. CEPHALÒZIA, Dumort. (Pl. 23.)

Leaves mostly succubous, chiefly 2-lobed, the margins uniformly plane or subincurved; underleaves smaller, often wanting except on fruiting branches. Branches from the under side of the stem. Monœcious or diœcious. Involucral leaves numerous, capitate, 3-ranked, usually 2-lobed; perianth long, triangular-prismatic, the constricted mouth variously dentate. Calyptra small. Capsule somewhat oblong. Elaters free. Spores minute. Antheridia in the base of inflated spicate leaves. (Name from κεφαλή, *head*, and ὄζος, *bud*, for the capitate involucre.)

§ 1. CEPHALOZIA proper. *Perianth more or less 3-angled or 3-carinate; leaf-cells large (mostly 25–50 μ broad); plants mostly medium-sized.*

* *Underleaves rarely present except on fruiting branches.*

1. **C. Virginiàna,** Spruce. Without runners, usually pale; leaves small, obliquely round-ovate, acutely 2-lobed nearly to the middle; cells quadrate-hexagonal, opaque; diœcious, rarely monœcious; involucral leaves round-quadrate, with slender acuminate lobes; perianth large, widest above the middle, unequally ciliolate; capsule large, long-exserted; antheridial spike long. (C. catenulata of authors; not *Huebn.*) — On rotten wood or swampy ground, N. Eng. to Va., and southward.

2. **C. multiflòra,** Spruce. (Pl. 23.) Often subpinnate, without runners, pale green; leaves small, round-rhombic, decurrent, bifid ⅓ their length; cells quadrate-hexagonal, pellucid; diœcious; inner involucral leaves 3–4 times as long as the outer; perianth linear-fusiform, 3-plaited when young, triangular only above when mature, ciliate or toothed, fleshy; calyptra fleshy, oval-globose; capsule rather short-pedicelled; spores cinnamon-color. — On the ground and rotten wood; common. (Eu.)

3. **C. pléniceps,** Underw. Stems very short, branching, densely cespitose, pale green or whitish; leaves thick, orbicular, strongly concave, subclasping but not decurrent, bifid ⅓ their length, the acute lobes incurved and strongly connivent; involucral leaves oblong, palmately 2–4-cleft, the ventral like the underleaves; perianth large, oblong-cylindric, obtusely angled, the plicate mouth denticulate. (Jungermannia pleniceps, *Aust.*) — Among Sphagnum in the White Mts. (*Oakes*).

4. **C. bicuspidàta,** Dumort. Prostrate or assurgent, cespitose, usually greenish or reddish, with runners; lower leaves small and distant, the upper larger, round-ovate, cleft nearly to the middle, the lobes ovate-lanceolate and acute, the lower lobe narrower and acuminate; cells large, pellucid; monœcious; involucral leaves about 3 pairs, the innermost nearly three times as long as the outer, cleft ½ their length; perianth four times as long as the leaves, linear-prismatic or fusiform, thin, denticulate or ciliate; capsule cylindric-oblong; spores purple. (Jungermannia bicuspidata, *L.*) — On the ground, mountains of N. Eng., N. Y., and N. J. (Eu.)

5. **C. curvifòlia,** Dumort. Slender, rarely forked, without runners, greenish, reddish, or often purple; leaves imbricate, ascending, obovate, concave, semicordate at base, lunately bifid below the middle, the lobes incurved or hooked; cells small, quadrate; monœcious or diœcious; involucral leaves complicate, the lobes subovate, spinulose-denticulate; perianth large, rose-purple, triquetrous, the wide mouth ciliate; calyptra thin; capsule oblong-globose. (Jungermannia curvifolia, *Dicks.*) — On rotten logs in swamps, etc.; common. (Eu.)

* * *Underleaves usually present; leaves rarely subimbricate.*

6. **C. flùitans,** Spruce. Stems 2–3′ long, loosely creeping, with short thick runners; leaves large, ovate-oblong, lobed to near the middle, the lower lobe larger, lanceolate, obtuse; cells large, mostly hexagonal; underleaves linear, appressed; diœcious; involucral leaves cleft to the middle; perianth oval-cylindric, nearly entire; calyptra short, pyriform; capsule oblong; spores small, minutely tuberculate; antheridia globose, pedicelled, solitary in the axils. — In bogs, on mosses or partly floating; rare. (Eu.)

§ 2. CEPHALOZIÉLLA. *Perianth* 3–6-*angled; leaf-cells small* (14–20 μ *broad*); *plants small, often minute; underleaves present in* n. 9.

7. **C. divaricàta,** Dumort. Sparingly branched, without runners; leaves very small, cuneate or round-quadrate, the ovate-triangular lobes acute; cells pellucid or subopaque; involucral leaves larger, the lobes acute, denticulate; perianth linear or narrowly fusiform, prismatic, denticulate or subentire; capsule oblong-globose, long-exserted. (Jungermannia divaricata, *Smith.*) — Dry rocks and sand, pine barrens of N. J., and northward. (Eu.)

8. **C. Macoùnii,** Aust. Slender, much branched, dark green; leaves scarcely broader than the stem, wide-spreading, bifid with a broad or lunate sinus, the broad-subulate lobes mostly acute; cells subquadrate, somewhat pellucid; diœcious; involucral leaves appressed, 2–3-lobed, irregularly spinulose; perianth small, whitish, obovate or ovate-fusiform, obtusely 3-angled, setulose or ciliate. — Rotten logs, mountains of N. Eng., and northward (*Austin, Macoun*).

9. **C. Sullivántii,** Aust. Stems 3–6″ long, fleshy, rootlets numerous; fertile branches suberect, clavate; leaves imbricate, often narrower than the stem, subquadrate-ovate, more or less serrate, the sinus and lobes subacute; diœcious; involucral leaves 3, erect, free; perianth broadly oval or subobovate, obtusely and sparingly angled, the apex slightly plicate, the mouth connivent, dentate, sometimes narrowly scarious; capsule oval. — On rotten wood, N. J., Ohio, and Ill.; rare. Our smallest species.

### 13. ODONTOSCHÍSMA, Dumort. (Pl. 24.)

Leaves succubous, ovate or roundish, entire or retuse, rarely bidentate; underleaves minute, sometimes obscure or wanting. Diœcious or sometimes monœcious. Fruit terminal on a short branch from the lower side of the stem. Involucral leaves few, 3-ranked, bifid or rarely 3–4-cleft; perianth large, triangular-fusiform, ciliate or dentate. Calyptra membranous. Capsule cylindric-oblong. Antheridia in small whitish spikes on the under side of the stem. (Name from ὀδούς, *a tooth*, and σχίσμα, *a cleft*, alluding to the perianth.)

1. **O. Sphágni,** Dumort. (Pl. 24.) Leaves spreading or ascending, ovate, rounded or oblong, entire or retuse, subconcave; underleaves mostly wanting; perianth 3–6 times longer than the leaves, subulate-fusiform, laciniate or ciliate. (Sphagnœcetis communis, *Nees.*) — Among mosses, N. J. to Ill., and southward. (Eu.)

2. **O. denudàta,** Lindb. Stems densely rooting, somewhat leafless at base, flagellate, branching above; leaves spreading, broadly ovate, entire; underleaves broadly oval, entire or subdenticulate; perianth close-connivent above, at length bursting irregularly. — On rotten wood, Canada to Ohio, and south along the mountains. (Eu.)

### 14. KÁNTIA, S. F. Gray. (Pl. 24.)

Leaves large, incubous, flat or convex, entire or retuse; underleaves small, roundish, the apex entire, retuse or bifid. Diœcious or monœcious. Involucre pendulous, subterranean, clavate or subcylindric, fleshy, hairy, attached to the stem by one side of its mouth. Calyptra membranous, partly adnate to the involucre. Capsule cylindric, the valves spirally twisted. Spores minute, roughish. Antheridia solitary in the reduced leaves of short lateral branches. (Name from *J. Kant*, a physician at The Hague.)

1. **K. Trichómanis,** S. F. Gray. (Pl. 24.) Creeping, without ventral runners; leaves pale green, imbricate, spreading, roundish-ovate, obtuse. (Calypogeia Trichomanis, *Corda.*) — On the ground and rotten logs; very common. (Eu.) — Var. RIVULÀRIS, Aust. Leaves dusky green or blackish, more scattered, flaccid; cells large. N. J. (*Austin.*) — Var. TÉNUIS, Aust. Very slender, innovate-branching; leaves smaller, especially above, dimidiate-ovate or subfalcate, subdecurrent. Southern N. J. (*Austin*).

2. **K. Sullivántii,** Underw. Prostrate, with ventral runners; leaves flat, subcontiguous or imbricate, obliquely round-ovate, minutely 2-toothed with a lunulate sinus, abruptly decurrent; cells large, uniform; underleaves minute, the upper orbicular, bifid, the lower twice 2-lobed, the primary lobes round-quadrate, divaricate, the secondary ovate or subulate. (Calypogeia Sullivantii, *Aust.*) — Delaware Water Gap, N. J. (*Austin*).

### 15. SCAPÀNIA, Dumort. (Pl. 24.)

Leaves complicate-bilobed, the upper lobe smaller, the lower succubous; margins entire or dentate or ciliate; underleaves none. Diœcious. Fruit terminal. Involucral leaves like the cauline but more equally lobed; perianth obovate, dorsally compressed, bilabiate, the mouth truncate, entire or toothed, decurved. Capsule ovate. Elaters long, attached to the middle of the valves. Antheridia 3 – 20, in the axils of small saccate leaves, which are scarcely imbricate or crowded into terminal heads. (Name from *σκαπάνιον, a shovel,* from the form of the perianth.)

* *Leaf-lobes somewhat equal.*

1. **S. subalpìna,** Dumort. Leaves equidistant, imbricate, cleft nearly to the middle, the roundish obtuse lobes denticulate on the outer margin; perianth much exceeding the involucral leaves, obovate from a narrow base, denticulate. — Mountains of N. Eng. (*Oakes, Austin*); L. Superior (*Gillman, Macoun*). (Eu.)

2. **S. glaucocéphala,** Aust. Stems short, cespitose, creeping or ascending, subsimple, with numerous offshoots; leaf-lobes broadly ovate, entire, mostly obtuse and apiculate; involucral leaves sometimes denticulate; perianth small, subcuneate, entire. (Jungermannia glaucocephala, *Tayl.;* S. Peckii, *Aust.*) — On rotten wood, N. Eng. to N. Y. and Canada.

* * *Lower lobe about twice the size of the upper, except near the summit.*

+- *Leaves broader than long; upper lobes rounded or blunt.*

3. **S. undulàta,** Dumort. (Pl. 24.) Ascending or erect, slightly branched; leaves lax, spreading, entire or ciliate-denticulate, the lobes round-trapezoidal, equal at the summit of the stem; perianth oblong-incurved, nearly entire, twice as long as the outer involucre. — In woods, damp meadows, and rills; common, especially in mountain districts. — Var. PURPÙREA, Nees; a form with long lax stems and rose-colored or purplish leaves. (Eu.)

4. **S. irrígua,** Dumort. Creeping; leaves somewhat rigid, repand, deeply lobed; lobes rounded, submucronate, the lower appressed, the upper convex with incurved apex; perianth ovate, denticulate. (S. compacta, var. irrigua, *Aust.*) — Wet places, N. J., Catskill Mts., mountains of N. Eng., and northward. (Eu.)

+- +- *Leaves longer than broad; upper lobes more or less acute.*

5. **S. nemoròsa,** Dumort. Rather stout, flexuose, creeping at base, leaves rather distant, decurrent on both sides, ciliate-dentate, the lower lobe obovate, obtuse, slightly convex, the upper cordate, acute, concave; perianth densely ciliate; capsule large, roundish-ovate, reddish-brown. (S. breviflora, *Tayl.*) — On rocks, etc., in swamps and rills; common and variable. (Eu.)

6. **S. Oakèsii,** Aust. Leaves obovate, somewhat spreading, often deflexed, closely complicate, convex, the lower lobe coarsely dentate, and with deep purple spur-like teeth on the keel, the upper roundish and less dentate; perianth usually dentate. — White Mts. (*Oakes, Austin*).

* * * *Lower lobes 3 – 4 times the size of the upper.*

7. **S. exsécta,** Aust. Ascending; leaves subcomplicate, entire, the lower lobe ovate, acute or bidentate, concave, the upper small and tooth-like; involucral leaves 3 – 5-cleft; perianth oblong, obtuse, plicate. (Jungermannia exsecta, *Schmidel.*) — High mountains, far northward; rare. — Perhaps better retained in Jungermannia. (Eu.)

8. **S. umbròsa,** Dumort. Stems short, decumbent, slightly branched; leaf-lobes ovate, acute, serrate; perianth incurved, naked at the mouth. — White Mts.; rare. — The tips of the shoots are frequently covered with a dark mass of gemmæ. (Eu.)

### 16. DIPLOPHÝLLUM, Dumort. (Pl. 25.)

Leaves rather narrow, complicate-bilobed, the lobes subequal or the upper smaller, the lower succubous; underleaves none. Fruit terminal. Involucral leaves few. Perianth cylindrical, scarcely or not at all compressed, pluriplicate, denticulate. (Name from διπλός, *double*, and φύλλον, *leaf*, on account of the folded 2-lobed leaves.)

1. **D. álbicans,** Dumort., var. **taxifòlium,** Nees. Stems ascending, almost rootless; leaves closely folded, subdenticulate, with a rudimentary pellucid line near the base or none, the lobes obtuse or acutish, the lower oblong-scymitar-shaped, the upper smaller, subovate; perianth ovate, plicate. (Jungermannia albicans and J. obtusifolia of *Sulliv.;* not of *L.* and *Hook.*) — Under rocks in mountain ravines and on the ground. (Eu.) — The typical form occurs in N. Scotia, distinguished by a broad pellucid median line in both lobes.

### 17. GEÓCALYX, Nees. (Pl. 23.)

Leaves succubous, bidentate; underleaves 2-cleft, with linear divisions. Fruit lateral, pendent. Involucre simple, fleshy, saccate, oblong, truncate, attached to the stem by one side of the mouth. Calyptra membranous, partly adnate to the involucre. Capsule oblong. Elaters free. Antheridia in the axils of small leaves on spike-like lateral branches. (Name from γέα, *the earth*, and κάλυξ, *a cup*, from the subterranean involucres.)

1. **G. gravèolens,** Nees. Leaves ovate-quadrate, 2-toothed, light green; underleaves oval-lanceolate, cleft to the middle. — On the ground, and rotten logs; not rare. (Eu.)

### 18. LOPHOCÓLEA, Dumort. (Pl. 23.)

Leaves succubous, dorsally decurrent, obliquely ovate-oblong, broadly truncate or bidentate; underleaves smaller, more or less quadrate, bifid or with 4 – 8 capillary lobes. Diœcious or monœcious. Fruit terminal on the main stem or primary branches. Involucral leaves 2 – 4, large, often spinulose; perianth triangular-prismatic, 3-lobed, ciliate or laciniate. Calyptra short, obovate, at length lacerate above. Capsule oblong-globose. Antheridia mostly solitary in or near the base of ordinary leaves. (Name from λόφος, *a crest*, and κολεός, *a sheath*, from the crested perianth.)

* *Underleaves mostly bifid* (*or* 3 – 4-*cleft in* n. 1); *divisions mostly entire.*

1. **L. bidentàta,** Dumort. Stems 1 – 2′ long, procumbent, sparsely branching; leaves pale green, ovate-triangular, acutely 2-toothed, the teeth oblique with a lunulate sinus; monœcious; perianth oblong-triangular, laciniate; antheridia 2 – 3 in a cluster, axillary. — On rocks in shady rills; not common. (Eu.)

2. **L. Austìni,** Lindb. Creeping; leaves uniformly deeply lobed, the lobes and usually the sinus acute; underleaves comparatively small, the lobes subulate; cells small; monœcious; antheridia solitary in the upper axils. (L. minor, *Aust.;* not *Nees.*) — On roots of trees in woods (*Austin*). Imperfectly known.

3. **L. Macoùnii,** Aust. Stems very short, prostrate, ascending at the apex, densely radiculose; leaves suberect, ovate-subquadrate, 2-lobed with ob-

tuse lobes and sinus, or retuse or often entire; underleaves light pink, deeply bifid, the setaceous lobes spreading-incurved; monœcious; involucral leaves somewhat oblong, repandly 2-4-toothed at the apex; perianth subobovate, slightly angled. — On logs, Little Falls, N. Y. (*Austin*); Ont. (*Macoun*).

4. **L. mìnor,** Nees. Diffusely branching; leaves pale green, oval-subquadrate, expanded, convex, slightly rigid, equally and acutely bifid with a lunate sinus; underleaves ½ as large, deeply bifid, the lanceolate lobes acuminate; diœcious; involucral leaves like the cauline; perianth obtusely triangular-plicate at the apex. (L. crocata, *Aust.*; not *Nees.*) — On the ground and dry rocks in limestone regions (*Austin*). (Eu.)

* * *Divisions of the underleaves more or less dentate.*

5. **L. heterophýlla,** Nees. (Pl. 23.) Stems short, creeping or ascending, much branched; leaves ovate-subquadrate, entire, retuse and bidentate on the same stem; underleaves large, 2-3-cleft; involucral leaves lobed and dentate; perianth terminal, the mouth crested. — On the ground and rotten logs in woods and swamps; very common. (Eu.)

6. **L. Hàllii,** Aust. Creeping, very slightly rooting; leaves subvertical, oblong, cleft nearly to the middle with obtuse sinus and erect mostly obtuse lobes; lower underleaves small, subequally 2-parted with an obtuse sinus, the upper ones larger, with a single tooth on each side or palmately 3-4-parted, the apical sublanceolate and narrowly bifid. — On the ground, Ill. (*Hall*).

## 19. CHILOSCỲPHUS, Corda. (Pl. 23.)

Leaves succubous, dorsally decurrent, mostly rounded and entire; underleaves rooting at the base, usually deeply 2-cleft. Fruit terminal on a very short lateral branch. Involucral leaves 2-6, the outer smaller, the inner variously cut; perianth small, obconic or campanulate, 3-angled and 3-lobed only at the apex, the lobes usually spinose. Calyptra fleshy, subglobose or clavate Capsule oblong-globose. Antheridia in the saccate bases of stem-leaves. (Name from χεῖλος, *a lip*, and σκύφος, *a bowl*, from the form of the perianth.)

* *Underleaves 4-parted.*

1. **C. ascéndens,** Hook. & Wils. (Pl. 23.) Prostrate; leaves large, pale green, ascending, roundish-oblong, slightly emarginate; involucral leaves two, 2-cleft; perianth 2-3-lobed, the lobes long and irregularly lacerate-toothed. — On rotten logs; rather common.

* * *Underleaves bifid.*

2. **C. palléscens,** Dumort. Procumbent, creeping; leaves flattened, ovate-subquadrate, obtuse or retuse; underleaves ovate, distant, free; involucral leaves two, 2-toothed; perianth deeply trifid, the lobes spinose-dentate, mostly shorter than the conspicuous calyptra. — Mountains of N. Eng. (*Oakes*).

3. **C. polyánthos,** Corda. Procumbent, creeping; leaves subascending, ovate-subquadrate, truncate or subretuse; underleaves ovate-oblong, distant, free; involucral leaves 2, slightly 2-toothed; perianth 3-lobed, the short lobes nearly entire, shorter than the calyptra. — Var. RIVULÀRIS, Nees. Larger, more branching, succulent; leaves mostly rounded above; underleaves often divided in halves or wanting. — On the ground among mosses or on rotten logs, common; the variety in shaded rills or still ponds. (Eu.)

## 20. PLAGIOCHÌLA, Dumort. (Pl. 24.)

Leaves large, succubous, rounded or truncate above, dentate or spinose or rarely entire, the dorsal margin reflexed; underleaves usually none. Diœcious or monœcious. Fruit terminal, or axillary by the growth of offshoots. Involucral leaves larger than the cauline; perianth laterally compressed, erect or decurved, obliquely truncate and bilabiate, the lobes entire or ciliate-dentate. Capsule thick, oval. Elaters attached to the middle of the valves. Antheridia oval, 2 – 3 in the axils of spicate leaves. (Name from πλάγιος, *oblique*, and χεῖλος, *lip*, from the form of the perianth.)

* *Underleaves 2 – 3-cleft, fugacious.*

1. **P. porelloìdes,** Lindenb. Branches ascending; leaves subimbricate, convex-gibbous, round-obovate, the uppermost repand-denticulate, the rest entire, the dorsal margin reflexed; perianth terminal, oblong-ovate, the mouth compressed, denticulate. — Among mosses in swamps and river-bottoms; common.

2. **P. interrúpta,** Dumort. (Pl. 24.) Prostrate, horizontally branched, copiously rooting; leaves imbricate, horizontal, oval, entire or slightly repand; underleaves lanceolate; perianth terminal, broadly obconic, the mouth compressed, repand-crenulate. (P. macrostoma, *Sulliv.*) — Moist banks and decayed logs, N. Eng., Ohio, and northward. (Eu.)

* * *Underleaves wanting.*

3. **P. spinulòsa,** Dumort. Creeping, branches ascending; leaves remote, obliquely spreading, obovate-cuneate, the dorsal margin reflexed, entire, the ventral and apex spinulose-toothed; perianth rounded, at length oblong, the mouth spinulose. — Shaded rocks in mountain regions; rare. (Eu.)

4. **P. asplenoìdes,** Dumort. Branched, creeping or ascending; leaves subimbricate, obliquely spreading, round-obovate, entire or denticulate, the dorsal margin reflexed; perianth much exceeding the involucral leaves, oblong, dilated at the truncate or ciliate apex. — In rocky rivulets; common. (Eu.)

## 21. MÝLIA, S. F. Gray. (Pl. 25.)

Leaves succubous, semi-vertical, circular, or ovate and pointed; underleaves subulate. Diœcious. Fruit terminal or pseudaxillary. Involucral leaves 2, clasping; perianth ovate-oblong, laterally compressed above a subterete base, the apex at length bilabiate, denticulate. Capsule ovate, coriaceous. Elaters free. Antheridia 2 in the axils of bracts clustered near the apex of distinct branches. (Name from *Mylius*, an early botanist.)

1. **M. Taylòri,** S. F. Gray. Stems erect, nearly simple, radiculose; leaves large, convex, orbicular, entire, purplish; cells large; underleaves lance-subulate, entire or subdentate; perianth terminal, oval; calyptra finally long-exserted. (Jungermannia Taylori, *Hook.*) — Wet rocks, high mountains of N. Eng. and N. Y. (Eu.)

## 22. HARPÁNTHUS, Nees. (Pl. 23.)

Leaves succubous, semi-vertical, ovate, emarginate; underleaves connate with the leaves, ovate or lanceolate, 1-toothed at base. Diœcious. Fruit on short shoots from the axils of the underleaves, finally sublateral. Involucral leaves 2 or 4. Perianth terete, the lower half thickened. Calyptra fleshy, confluent with the perianth for ⅔ its length. Capsule oval. Antheridia 1 or 2 in the axils of bracts terminal on slender branches. (Name from *ἅρπη, a sickle,* and *ἄνθος, flower.*)

1. **H. scutàtus,** Spruce. Stems filiform, decumbent, usually simple; leaves smaller at the base and apex of the stems, roundish-ovate, concave, sharply bidentate, the apex lunate or acute; underleaves large, acuminate involucral leaves two, 2–3-cleft, the upper adnate to the perianth; perianth ovate, becoming obovate, obscurely 3–4-plicate, splitting above on one side; capsule deep brown. (Jungermannia scutata, *Weber.*) — On rotten logs in damp places; common. (Eu.)

**H.** Flotoviànus, Nees. (Pl. 23.) Stems flexuous, procumbent, mostly unbranched; leaves ovate-orbicular, horizontal, the apex contracted and emarginate with a shallow sinus; underleaves large, ovate or lanceolate, obliquely inserted, entire or more often toothed on one or both sides near the middle; diœcious; perianth subcylindric, slightly sickle-shaped, the mouth pointed at first, notched on one side and finally crenulate; antheridia elliptic, single in the base of swollen leaves. (Pleuranthe olivacea, *Tayl.*) — "North America" (*Drummond*), but not collected recently; certainly extralimital.

## 23. LIOCHLÆNA, Nees. (Pl. 25.)

Leaves succubous, ovate-oblong, entire or slightly retuse; underleaves none. Diœcious or monœcious. Involucral leaves 2 or 4, like the cauline; perianth pyriform, becoming cylindric, incurved, abruptly rounded at the summit, the minute orifice prominently ciliolate. Capsule oblong, long-exserted. Elaters attached to the middle of the valves. Spores minute, globose. Antheridia in the axils of ordinary leaves. Archegonia 5–12. (Name from *λεῖος, smooth,* and *χλαῖνα, a cloak,* referring to the perianth.)

1. **L. lanceolàta,** Nees. Closely creeping, branched; leaves sometimes decurrent; involucral leaves vertical; perianth at right angles with the stem; monœcious. — On banks and rotten logs; not rare. (Eu.)

## 24. JUNGERMÁNNIA, Micheli. (Pl. 25.)

Leaves succubous, rarely subtransverse, entire, lobed or dentate, the margins never recurved; underleaves present or none. Diœcious or monœcious. Fruit terminal. Involucral leaves 4 or fewer, like the cauline or more incised, free; perianth laterally compressed or terete, usually 3–10-carinate, the usually small mouth entire or toothed. Calyptra oval-pyriform. Capsule globose or oblong, rarely cylindric. Spores minute, smooth or roughish. Archegonia 8–70. (Named for *L. Jungermann,* a German botanist of the 17th century.)

§ 1. JUNGERMANNIA proper. *Leaves orbicular or ovate, entire or barely retuse; underleaves none* (*very small in* n. 1).

1. **J. Schràderi,** Martius. (Pl. 25.) Creeping, flexuous; leaves round-elliptic, entire, ascending; underleaves broadly subulate, not apparent on old stems; involucral leaves large, elongated, the inner smaller and more or less laciniate; perianth oval-obovate, ascending. — On the ground and rotten logs; common. (Eu.)

2. **J. sphærocárpa,** Hook. Stems creeping, the tips ascending, subsimple, greenish; leaves semi-vertical, rather rigid, orbicular, obliquely spread-

ing, decurrent dorsally, pale green; involucral leaves separate; perianth exserted, obovate-oblong, the mouth 4-cleft; capsule globose. — Mountains of N. Eng. (*Austin*); rare. (Eu.)

3. **J. pùmila,** With. Stems creeping, the tips somewhat ascending, subsimple, rooting, pale; leaves ascending, ovate, obtuse, concave, entire; involucral leaves like the cauline, erect; perianth terminal, fusiform, plicate above and denticulate; capsule oval. — On shaded rocks along rivulets, Closter, N. J. (*Austin*). (Eu.)

§ 2. LOPHÒZIA. *Leaves roundish or subquadrate, bidentate, bifid, or sometimes 3–5-cleft; underleaves none, or small and mostly 2-parted; perianth usually strongly plicate.*

* *Underleaves present.*

+ *Leaves bifid or 2-lobed.*

4. **J. Gillmàni,** Aust. Stems short, densely cespitose, prostrate, strongly radiculose; leaves vertical, round-ovate, subconcave, bifid, the lower leaves with usually acute sinus and lobes, the upper much larger with rounded lobes and obtuse sinus; underleaves entire or the broader bifid; perianth without involucral leaves, dorsal, sessile, obovate, subgibbous, ciliate, at length much incised. — In a sandstone cave, Traine Island, L. Superior (*Gillman*).

5. **J. Wattiàna,** Aust. Stems rather thick, 2–4″ long, fragile, subflexuose, strongly radiculose; leaves subvertical or spreading, subovate, concave, emarginately 2-lobed, the lobes acute or the upper obtuse; underleaves somewhat obsolete, hair-like or subulate, incurved; involucral leaves little larger, less deeply lobed; perianth terminal, small, ovate-gourd-shaped, whitish, ciliate. — On the ground, northern shore of L. Superior (*Macoun*).

+ + *Leaves 3–5-cleft.*

6. **J. barbàta,** Schreb. (Pl. 25.) Procumbent, sparingly branched; leaves roundish-quadrate, with obtuse, acute, or mucronulate lobes and obtuse undulate sinuses; underleaves broad, entire or 2-toothed, sometimes obsolete; perianth ovate, plicate-angled toward the apex, denticulate. — On rocks in mountain regions; common. (Eu.)

Var. **attenuàta,** Martius. Ascending, with numerous offshoots; stem-leaves semi-vertical, obliquely spreading, roundish, acutely 2–4-toothed, those of the shoots closely imbricate, premorsely 2–4-denticulate; involucral leaves two, 3-toothed; perianth oblong. — In similar localities. (Eu.)

7. **J. setifórmis,** Ehrh. Erect or ascending, dichotomous; leaves toothed at base, 3–4-cleft, the lobes ovate-oblong, acute, channelled; underleaves ciliate-dentate at base, deeply bifid, the divisions lanceolate, acuminate; involucral leaves more toothed than the cauline; perianth terminal, oval, plicate. — Alpine summits of N. H. (*Oakes*). (Eu.)

* * *Underleaves wanting.*

+ *Leaves 2-toothed; involucral leaves 2–4-cleft.*

8. **J. alpéstris,** Schleich. Stems creeping, crowded, bifid-branching, the ends ascending; leaves semi-vertical, ovate-subquadrate, obliquely toothed, the teeth unequal, acute or mucronulate, distant; involucral leaves wider, 2–3-cleft; perianth twice as long, oblong, smooth, the mouth complicate; capsule oval. — Alpine region of N. H. (*Oakes*). (Eu.)

9. **J. ventricòsa,** Dicks. Stems dense, close-creeping, branching from beneath; leaves semi-vertical, subquadrate, mostly flat, broadly and acutely emarginate-bidentate, often bearing globules; involucral leaves larger, round, erect-spreading, 3 – 4-cleft, subdentate; perianth ovate, inflated, narrowly complicate above; capsule oval. — On the ground and rotten wood in the mountains, and far northward; common. (Eu.)

10. **J. Wallrothiàna,** Nees. Minute, blackish; stems creeping, strongly rooting, subsimple; leaves clasping, semi-vertical, closely imbricate, ovate-quadrate, concave, obtusely bidentate with an obtuse sinus, or acute in the upper leaves; involucral leaves larger, erect, connate at base, 3-toothed, wavy-plicate; perianth oval-cylindric, plicate and subdentate, pellucid, reddish below. — On coarse sand in the White Mts. (*Oakes*). (Eu.)

+ + *Leaves bifid or 2-lobed, the ventral lobe often inflexed or subcomplicate; involucral leaves merely toothed, except in* n. 11.

11. **J. láxa,** Lindb. Widely creeping, mostly simple, usually purplish-black; leaves imbricate, or distant on the erect fertile stems, 2 – 3-lobed, the lobes obtuse, wavy; cells very large, lax; involucral leaves 2, wide, short, cristate-undulate, obtusely many-lobed; perianth exserted, long-clavate, subplicate above, minutely ciliate. (J. polita, *Aust.;* not *Nees.*) — Among Sphagnum near Closter, N. J. (*Austin*).

12. **J. excìsa,** Dicks. Stems closely creeping, short, subsimple, rather rigid; leaves semi-vertical, erect spreading, pellucid, roundish, with straight acute lobes and deep obtuse sinus; involucral leaves erect, quadrate, usually 4 – 5-toothed; perianth erect, oblong, pale, banded and spotted with pink, plicate above, irregularly denticulate. — Sterile grounds in open woods; common. (Eu.)

Var. **críspa,** Hook. Leaves round-quadrate, closely imbricate, deeply and obtusely 2 – 3-cleft; involucral leaves 3 – 4-cleft, connate at base, subserrate. (J. intermedia, *Lindenb.*) — In crevices of rocks, N. Y. and N. J. (*Austin*). (Eu.)

13. **J. incìsa,** Schrad. Stems thick, rooting, closely creeping or ascending; leaves crowded, semi-vertical, complicate, subquadrate, 2 – 6-cleft, the acute lobes unequal, more or less spinulose-dentate; involucral leaves similar, more plicate and dentate, free; perianth short, oval or obovate, plicate above, denticulate. — On rotten wood in the mountains, and northward. (Eu.)

§ 3. SPHENÓLOBUS. *Leaves 2-lobed, subtransverse, complicate-concave; underleaves none; involucral leaves* 2 – 3-*cleft.* (Verging toward Marsupella on one side and Diplophyllum on the other.)

14. **J. Michaùxii,** Weber. Stems ascending, flexuous by repeated innovations below the summit; leaves crowded, subvertical, erect-spreading, subsaccate at base, subquadrate, bifid with straight acute lobes and a narrow sinus; involucral leaves similar, the outer serrulate, the inner smaller; perianth ovate-subclavate, obtuse, plicate above, fringed. — Fallen trunks, mountains of N. Y. and N. Eng.; common. (Eu.)

15. **J. minùta,** Crantz. Rootless; leaves cleft $\frac{1}{4}$ – $\frac{1}{2}$ their length, the lobes ovate, subequal, acute or obtuse, entire, or gemmiparous ones subdentate; involucral leaves trifid; perianth oval-oblong or subcylindric. — On rocks in high mountain regions, and northward. (Eu.)

16. **J. Helleriàna,** Nees. (Pl. 25.) Creeping, entangled; leaves spreading, subascending, cleft ⅓ – ½ their length, the lobes equal, acute, entire or serrate; involucral leaves 2 – 3-cleft, spinulose-serrate; perianth ovate, the mouth contracted. — On rotten wood, N. Y., N. Eng., and northward. (Eu.)

§ 4. GYMNOCÓLEA. *Leaves 2-lobed; underleaves none; involucral leaves like the cauline; perianth pedunculate, denticulate.*

17. **J. inflàta,** Huds. (Pl. 25.) Procumbent or ascending, loosely radiculose, branching; leaves semi-vertical, roundish-elliptic, inequilateral, the sinus and unequal lobes obtuse; perianth terminal or at length dorsal, oval or pyriform, smooth, the mouth connivent; capsule oblong. — On sterile ground and rocks, N. J. (*Austin*), and northward in the mountains. (Eu.)

## 25. MARSUPÉLLA, Dumort. (Pl. 23.)

Stems dorsally compressed, with rootlets at the base and often producing somewhat leafless runners. Leaves transverse, complicate-bilobed; involucral leaves 2 or 4, connate with the perianth. Perianth tubular or oval, subcompressed parallel to the base of the leaves. Elaters free. Spores round, rufous (in our species). Antheridia mostly terminal. (Name a diminutive of *marsupium*, a pouch, from the form of the perianth.)

1. **M. sphacelàta,** Dumort. Stems erect, subflexuous, pale brown; leaves rather distant, concave, obovate to obcordate, somewhat clasping, the sinus narrow; diœcious; involucral leaves larger than the cauline, cordate; perianth free at the apex, with 4 – 5 broad acute teeth; antheridia 1 – 3, in short terminal spikes. — Wet rocks, mountains of N. Eng. to N. J., and southward. (Eu.)

2. **M. emarginàta,** Dumort. (Pl. 23.) Stems simple or innovating at the summit, rigid, somewhat thickened upward; leaves usually broader than long, round-cordate or subquadrate, lobes obtuse or mucronate, sinus acute; diœcious; involucral leaves 4 – 8, usually larger, more deeply and acutely emarginate; perianth urceolate, the closed apex splitting into 4 – 5 triangular lobes; antheridia 2 – 3, oval, axillary in terminal spikes. (Sarcoscyphus Ehrharti, *Corda.*) — On wet rocks, chiefly in mountain rivulets, N. Y. and N. Eng. Floating forms are longer with distant leaves. (Eu.)

3. **M. adústa,** Spruce. Stems minute, clavate; leaves (5 – 8 pairs) imbricate, round or broadly ovate from a sheathing base, acutely lobed with angular sinus; monœcious; perianth included, campanulate, crenate becoming irregularly lobed; spores punctate; antheridia 1 or 2, oval, in the axils of the lower involucral leaves. (Gymnomitrium adustum, *Nees.*) — Alpine region of the White Mts. (*Oakes, Austin*). (Eu.)

## 26. NÁRDIA, S. F. Gray. (Pl. 25.)

Stems laterally compressed, usually without runners. Leaves succubous, subconcave or flat, the apex rounded, rarely retuse or bidentate; underleaves none (in our species). Monœcious or diœcious. Involucral leaves 2 – 4 pairs, connate at base. Perianth subcompressed laterally, connate with the involucral leaves. Antheridia terminal on somewhat spike-like stems. (Named for *S. Nardi*, an Italian abbot.)

§ 1. EÙCALYX. *Perianth connate at base with the inner involucral leaves, somewhat surpassing them, 3 – 8-carinate, the mouth constricted.*

1. **N. hyalìna,** Carring. Creeping, with ascending tips, the branches dichotomous-fastigiate, with claret-colored rootlets; leaves loosely imbricate, decurrent, roundish, repand-undulate; monœcious or diœcious; involucral leaves broader, appressed, one connate with the lower third of the perianth, which is somewhat exserted, obovate, plicate with acute rough angles, rostellate, at length 4-cleft; capsule round-ovate. (Jungermannia hyalina, *Lyell.*) — On banks in woods, Closter, N. J. (*Austin*), Ohio (*Lesquereux*). (Eu.)

2. **N. crenulàta,** Lindb. (Pl. 25.) Prostrate, branching; leaves orbicular, entire, larger toward the involucre and with large marginal cells; diœcious; involucral leaves 2, rarely 3, adnate to the base of the perianth, which is flattened or terete, more or less regularly 4 – 5-plicate, the angles smooth; mouth much contracted, toothed. (Jungermannia crenulata, *Smith.*) — On the ground in old fields, N. Y. and southward. (Eu.)

3. **N. crenulifórmis,** Lindb. Densely cespitose; fertile stems creeping, thickened upward, with numerous purple rootlets, the sterile subascending, attenuate upward; leaves subdecurrent, obliquely spreading, orbicular, concave, entire or nearly so; perianth small, subobovate, more or less connate with the involucral leaves, not exserted or slightly so, rooting at base, triquetrous above, becoming 4 – 7-plicate; calyptra often violet-purple; capsule oval-globose. (Jungermannia crenuliformis, *Aust.*) — On rocks in rivulets, Closter, N. J. (*Austin*), Coshocton Co., Ohio (*Sullivant*).

4. **N. bifórmis,** Lindb. Densely cespitose, much branched, innovating from beneath; rootlets numerous; leaves scarcely imbricate, alternate, spreading, obliquely semicircular or broadly ovate, retuse or entire, decurrent dorsally; cells large, hyaline; branch-leaves half as large, ovate or obovate, scarcely decurrent; diœcious; antheridia solitary; fruit unknown. (Jungermannia biformis, *Aust.*) — On steep wet rocks, Delaware Water Gap, N. J. (*Austin*).

§ 2. CHASCÓSTOMA. *Perianth exserted, subcampanulate and open, deeply laciniate, connate with the involucral leaves.*

5. **N. fossombronioìdes,** Lindb. Stems densely cespitose, ascending; rootlets numerous, purple; leaves 2-ranked, subvertical, spreading-subrecurved, rooting, closely imbricate, orbicular, clasping by a slightly cordate base, subventricose, undulate-repand, the apex uniplicate and slightly emarginate; monœcious; perianth very large, 6 – 10-plicate, the lobes entire; calyptra violet; capsule short-oval. (Jungermannia fossombronioides, *Aust.*) — On rocks in a rivulet, Closter, N. J. (*Austin*), and southward.

### 27. GYMNOMÍTRIUM, Corda. (Pl. 23.)

Leaves closely imbricated, 2-ranked on fascicled ascending julaceous stems, emarginate-bidentate; underleaves none. Diœcious. Involucre double, the inner shorter, of 2 or more dentate and deeply cleft leaves. Calyptra short, campanulate. Capsule globose, the valves at length reflexed. Elaters caducous. Antheridia in the axils of leaves, oval, stipitate. (Name from γυμνός, *naked*, and μιτρίον, *a little cap.*)

1. **G. concinnàtum,** Corda. Stems simple or imbricately branching, thickened at the apex; leaves ovate, bifid, with a narrow scarious margin.

(Cesia concinnata, *S. F. Gray.*) — Alpine regions of the White Mts. (*Oakes*). — Grayish or silvery-olive. (Eu.)

### 28. FOSSOMBRÒNIA, Raddi. (Pl. 23.)

Stems thalloid, with large subquadrate succubous leaves; underleaves none. Diœcious or monœcious. Fruit terminal or by innovation dorsal on the main stem. Involucral leaves 5 – 6 (in our species), small, subulate, adnate. Perianth open-campanulate or obpyramidal, crenate-lobed. Calyptra free, subglobose. Capsule short-pedicelled, globose, irregularly valved. Elaters very short, 1 – 3- (mostly 2-) spiral, free. Spores large, very rough. Antheridia 2 – 3, short-pedicelled, naked. Perfect archegonia 2 – 3. (Named for *V. Fossombroni*, an Italian Minister of State.)

* *Plant large or of medium size; stems mostly simple.*

1. **F. pusílla,** Dumort. (Pl. 23.) Stems 6 – 10″ long; leaves retuse, entire or irregularly indented; perianth obconic, dentate; elaters short and thick; spores brown, depressed-globose-tetrahedral, 40 $\mu$ broad, crested, the slender crests pellucid, rarely becoming confluent. — On damp ground. Its occurrence in America is doubtful. (Eu.)

2. **F. Dumortièri,** Lindb. Cespitose, greenish or brownish-yellow; stems 3 – 6″ long, 1″ wide, shortly bifurcate; rootlets copious, purple; leaves numerous, smaller toward each end of the stem; monœcious; perianth large, broadly obpyramidal; calyptra nearly as long; elaters scanty; spores globose-tetrahedral yellowish-brown, regularly pitted. — White Mts. (*Farlow*), N. J. (*Austin*), and perhaps elsewhere; confused with n. 1.

3. **F. angulòsa,** Raddi. Stems narrowly forked at the apex; leaves horizontal, subquadrate, the upper undulate-lobed; diœcious; perianth dilated-conic, crenate; spores brownish-yellow, globose-tetrahedral, not depressed, 30 $\mu$ broad, deeply reticulated, the reticulations large, 5 – 6-angled. — Brackish meadows, common; fruiting in early spring. (Eu.)

* * *Plant minute; stems forked or fastigiately divided.*

4. **F. crístula,** Aust. Stems 1 – 2″ long; leaves whitish, quadrate or round-obovate, subentire, strongly crisped-undulate; capsule immersed on a short pedicel; elaters short, more or less diverse, with a single narrow annular and spiral fibre; spores pale fuscous, more or less tuberculate. — On moist sand in unfrequented paths, Batsto, N. J. (*Austin*).

### 29. PALLAVICÍNIA, S. F. Gray. (Pl. 22.)

Thallus with a distinct costa. Fruit arising from the costa, at first terminal, becoming dorsal. Diœcious. Involucre cup-shaped, short-lacerate. Perianth long-tubular, denticulate. Calyptra irregularly lacerate. Capsule slender-cylindric. Elaters slender, free. Spores minute. Antheridia dorsal, covered with minute fimbriate scales. (Named for *L. Pallavicini*, Archbishop of Genoa.)

1. **P. Lyéllii,** S. F. Gray. Thallus thin, 1 – 4′ long, 3 – 5″ wide, simple or bifid, the margin entire, slightly crenate or serrate; cells large, oblong-hexagonal; perianth erect, fleshy (5 cells thick below), the somewhat constricted mouth lobate-ciliolate; pedicel long, exceeding the thallus; capsule cylindric,

five times as long as broad. (Steetzia Lyellii, *Lehm.*) — Among mosses in swamps and on dripping rocks; common, especially southward. (Eu.)

### 30. BLÀSIA, Micheli. (Pl. 23.)

Thallus simple or forked or stellate, with sinuous margins. Diœcious. Fruit from an oval cavity in the costa. Involucre mostly none. Calyptra obovate. Capsule oval-globose. Antheridia immersed in the thallus, covered with dentate scales. Gemmæ globose, issuing by a slender ascending tube from large flask-shaped receptacles which are immersed in the thallus. (Named for *Blasius Biagi*, a monk of Valombrosa and companion of Micheli.)

1. **B. pusílla**, L. Thallus ¾ – 1½′ long, 2 – 3″ wide, narrowly obovate, the margins pinnatifid-sinuous. — Wet banks; common. (Eu.)

### 31. PÉLLIA, Raddi. (Pl. 23.)

Thallus with a broad indeterminate costa. Monœcious or diœcious. Fructification dorsal near the end of the thallus. Involucre short, cup-shaped, lacerate-dentate. Calyptra membranous, oval, longer or shorter than the involucre. Capsule globose. Elaters long, free. Antheridia globose, immersed in the costa. (Named for *A. L. Pelli*, an Italian botanist.)

* *Monœcious.*

1. **P. epiphýlla**, Raddi. (Pl. 23.) Thallus oblong, lobed and sinuate, somewhat fleshy, much thickened in the middle; capsule exserted. — On the ground in wet places; not uncommon eastward. (Eu.)

* * *Diœcious.*

2. **P. endiviæfòlia**, Dumort. Thallus flat, green or purplish, broadly linear, dichotomous, the margin mostly undulate or crisped. — On the ground and in ditches; common, but often confused with n. 1. (Eu.)

3. **P. calycìna**, Nees. Thallus dichotomous, proliferous, the early divisions linear-oblong, the margins ascending and remotely sinuate, the later divisions linear-palmatifid, coarsely nerved; cells large, hexagonal; involucre ciliate-fringed or lacerate; calyptra smooth, included. — Wet limestones and shales. (Eu.)

### 32. METZGÈRIA, Raddi. (Pl. 23.)

Thallus linear, dichotomous, with well defined costa. Diœcious. Fructification arising from the under side of the costa. Involucre 1-leaved, scale-like, at length ventricose. Calyptra clavate or pyriform, fleshy. Capsule short-pedicelled. Elaters unispiral, some remaining attached to the tips of the valves. Spores minute, mostly smooth. Antheridia globose, enclosed in a scale on the under surface of the costa. (Named for *J. Metzger*, a German botanist.)

* *Densely villous throughout.*

1. **M. pubéscens**, Raddi. Thallus 1 – 2′ long, 1″ wide, alternately pinnate or somewhat decompound, the short linear branches of uniform width, flat, the margin undulate; hairs longer beneath, single or in twos and threes near the margin, irregularly curved; midrib nearly without cortical layer, with 6 – 10 (mostly 8) rows of very uniform peripheral cells; diœcious. — In mountain regions, eastward. (Eu.)

* * *Hairy on the margins and midrib beneath, smooth above; diœcious* (n. 4 *monœcious*).

2. **M. myriópoda,** Lindb. Thallus elongated (2′ long, ½″ wide), dichotomous, the long linear branches of uniform width, convex above, the reflexed margins not undulate; midrib densely pilose beneath; hairs rather long, straight or nodding, the marginal mostly in clusters of 3–6, some with discoid tips; midrib covered above with 2 rows of enlarged cells, and beneath with 3–7 (usually 4–6) rows of smaller cells, lax and often indistinct. (M. furcata, *Sulliv.*, in part; not *Nees.*) — Shaded rocks and trees in the Alleghanies (*Sullivant*), and southward.

3. **M. hamàta,** Lindb. Like the last; thallus much elongated (4′ long, 1–1½″ wide); hairs very long, divaricate and hooked-deflexed, the marginal in twos, rarely with discoid tips; midrib covered above and below with two rows of enlarged lax cells. (M. furcata, *Sulliv.*, in part.) — Alleghany Mts. (*Sullivant*).

4. **M. conjugàta,** Lindb. Thallus 1½′ long, ½–1″ wide, usually dichotomous, the short branches irregular in width, convex above, the margins more or less undulate; hairs rather long, straight, divaricate, the marginal usually in twos, very often disk-bearing; midribs covered above with 2, below with 3–6 rows of enlarged lax cells. — On shaded rocks and trunks of trees, central N. Y., and southward. (Eu.)

## 33. ANEÙRA, Dumort. (Pl. 23.)

Thallus fleshy, prostrate or assurgent from a creeping base; costa obscure. Diœcious or monœcious. Fructification arising from the under side near the margin. Involucre cup-shaped, short and lacerate, or none. Calyptra large, fleshy, more or less clavate. Capsule large, oblong-cylindric. Elaters unispiral, in part adherent to the tips of the valves. Spores minute, smooth or minutely roughened. Antheridia immersed in the surface of receptacles proceeding from the margin of the thallus. (Name from α- privative, and *νεῦρον, a nerve.*)

* *Thallus narrow (about 1″ wide), palmately divided.*

1. **A. làtifrons,** Lindb. Thallus cespitose, ascending or erect, usually dark green, 6–9″ long, mostly pellucid; branches linear, obtuse and emarginate, plano-convex; cells large, oblong-rhombic; monœcious; archegonia 3–10, short, conic; calyptra white, verrucose, pyriform-clavate; capsule oval, brown; spores 12½–14½ μ broad, globose, minutely and densely papillose; antheridia globose. (A. palmata of authors; not *Dumort.*) — On rotten logs; common.

* * *Thallus narrow (about 1″ wide), pinnate or bipinnate.*

2. **A. multífida,** Dumort. Thallus prostrate, brownish-green, pinnately divided, the primary portion biconvex, somewhat rigid, the branches horizontal, pectinately pinnate with narrow linear divisions; monœcious; fructification rising from the primary part or from the branches; involucre fleshy; calyptra tuberculate. — Var. MÀJOR, Nees. Primary portion and branches thick, the branches interruptedly pinnate with short obtuse divisions. — On decayed wood and moss in swamps, N. J. (*Austin*), and south in the mountains. (Eu.)

3. **A. pinnatífida,** Nees. Thallus pinnately divided or subsimple, flat or somewhat channelled; branches horizontal, the broader pinnatifid or dentate, obtuse; calyptra somewhat smooth.—On dripping rocks, Hokokus, N. J. (*Austin*), N. Haven, Conn. (*Eaton*). (Eu.)

* * * *Thallus wider (2″ or more), simple or irregularly lobed.*

4. **A. séssilis,** Spreng. Thallus decumbent, irregularly lobed, 1 – 2′ long, 3 – 5″ wide; involucre none; pedicel ¾ – 1′ long, sometimes folded upon itself and remaining within the calyptra, the capsule thus appearing sessile; antheridia on elongated receptacles. — Wooded swamps. Elongated floating forms, 5 – 6′ long, have been found in the White Mts. (*Farlow, Faxon*).

5. **A. pínguis,** Dumort. Thallus 1 – 2′ long, decumbent or ascending, fleshy, linear-oblong, simple or slightly lobed, the margin sinuate; diœcious; involucre short, lacerate; calyptra cylindric, smooth; capsule brownish, furrowed; antheridia in 2-lobed receptacles. — Wet banks, N. J. to Ohio, and southward. (Eu.)

## ORDER 138. ANTHOCEROTÀCEÆ. (HORNED LIVERWORTS.)

Plant-body a thallus, irregularly branching, flaccid, without epidermis or pores, and more or less vesiculose. Involucre single, tubular. Calyptra rupturing early near the base, and borne on the apex of the capsule. Capsule dorsal, pod-like, erect or curved outward, more or less perfectly 2-valved, usually stomatose, tapering into a pedicel or often sessile with a bulbous base. Columella filiform. Elaters with or without spiral fibres. Spores flattish, more or less convex-prismatic, papillose or smooth.

1. **Anthoceros.** Capsule narrowly linear, exsertly pedicelled, 2-valved. Elaters present.
2. **Notothylas.** Capsule very short, sessile, not valved below the middle. Elaters not obvious.

### 1. ANTHÓCEROS, Micheli. (Pl. 22.)

Thallus dark green or blackish, usually depressed, variously lobed, with large chlorophyll-grains, frequently glandular-thickened at the apex or in lines along the middle so as to appear nerved. Monœcious or diœcious. Capsule linear, 2-valved, exsertly pedicelled. Elaters simple or branched, often geniculate, more or less heteromorphous, the fibres wanting or indistinct. (Name from ἄνθος, *flower*, and κέρας, *horn*, from the shape of the capsule.)

1. **A. læ̀vis,** L. (Pl. 22.) Thallus smooth, nearly flat above; diœcious; involucre 1 – 2″ long, trumpet-shaped when dry, repand-toothed; capsule pale brown or yellowish, 1 – 1½′ long; elaters rather short, yellowish; spores yellow, nearly smooth, angular. — Wet clay banks, from Canada south and westward. (Eu.)

2. **A. punctàtus,** L. Thallus small, depressed, or often cespitose and erect, more or less glandular; monœcious; involucre rather short, oblong-linear, slightly repand, sometimes scarious at the mouth; capsule 1′ high, black; elaters fuscous, flattish, geniculate; spores black, strongly muriculate, sharply angled. — Wet banks, Canada to Mo., and southward. (Eu.)

### 2. NOTOTHỲLAS, Sulliv. (Pl. 22.)

Thallus orbicular, tender, laciniate and undulate or crisped, papillose-reticulate. Monœcious. Involucre sessile, continuous with the thallus, opening irregularly above. Capsule very short, oblong-globose or ovate-cylindric, pedicelled from a thickened bulb, 2-valved to the middle or rupturing irregularly. Elaters none, or fragmentary and inconspicuous. Spores subglobose, smoothish. Antheridia elliptic-globose, immersed in the thallus. (Name from *νῶτος, the back*, and *θυλάς, a bag*, from the shape and position of the involucre.)

1. **N. orbiculàris**, Sulliv. (Pl. 22.) Thallus 3–8″ wide; capsules 1–2″ long, erect or decurved, wholly included or slightly exserted, of thin and loose texture, with a suture on each side; spores light yellowish-brown. (Including N. valvata, *Sulliv.*) — Wet places, Canada to the Gulf.

2. **N. melanóspora**, Sulliv. Thallus small, depressed or sometimes cespitose, of lax texture; capsule often without sutures; spores dark brown, a half larger. — Moist ground, Ohio (*Sullivant*).

## ORDER 139. MARCHANTIÀCEÆ. LIVERWORTS.

Plant-body a thallus, dichotomous or subpalmately branching, usually innovating from the apex or beneath it, more or less thickened in the middle, and bearing numerous rootlets beneath and usually colored or imbricating scales. Epidermis usually more or less distinct and strongly porose above. Capsules globose, rarely oval, opening irregularly, pendent from the under side of a peduncled disk-like receptacle (*carpocephalum*). Elaters present, mostly 2-spiral.

* Thallus plainly costate, distinctly porose except in n. 6.

+ Gemmæ present on sterile stems.

1. **Marchantia.** Gemmæ in cup-shaped receptacles. Fertile receptacle 7–11-rayed.
8. **Lunularia.** Gemmæ in crescent-shaped receptacles. Fertile receptacle cruciform.

+ \+ Gemmæ wanting.

++ Receptacle conic-hemispherical, 2–4-lobed; perianth lobed or fringed.

2. **Preissia.** Receptacle 2–4-lobed, with as many alternate rib-like rays. Perianth 4–5-lobed.
3. **Fimbriaria.** Receptacle 4-lobed. Perianth conspicuous, split into 8–16 fringe-like segments.

++ ++ Receptacle more or less conical; perianth none.

4. **Conocephalus.** Thallus very large, strongly areolate. Receptacle conical, membranous.
5. **Grimaldia.** Thallus small. Peduncle chaffy at base and apex. Receptacle conic-hemispheric, truncately 3–4-lobed.
6. **Asterella.** Thallus eporose. Receptacle conic-hemispheric, becoming flattened, acutely 4- (1–6-) lobed.

* * Thallus thin, ecostate or barely costate.

7. **Dumortiera.** Receptacle convex, 2–8-lobed. Perianth none.

### 1. MARCHÁNTIA, Marchant f. (Pl. 22.)

Thallus large, forking, areolate, porose, with broad diffused midrib; gemmæ in a cup-shaped receptacle. Diœcious. Fertile receptacle peduncled from an apical sinus of the thallus, radiately lobed. Involucres alternate with the rays, membranous, lacerate, enclosing 3–6 1-fruited cleft perianths. Calyptra persistent. Capsule globose, exserted, pendulous, dehiscing by several revolute segments. Elaters long, attenuate to each end. Spores smooth. Antheridia immersed in a peduncled disk-like radiate or lobed receptacle. (Named for *Nicholas Marchant*, a French botanist.)

1. **M. polymórpha**, L. Thallus 2–5′ long, ½–1½′ wide, numerously porose, venulose; receptacle divided into usually 9 terete rays; peduncles 1–3′ high; antheridial disk crenately or palmately 2–8-lobed, on a peduncle 1′ high or less. — Everywhere common. (Eu.)

## 2. PREÌSSIA, Nees. (Pl. 22.)

Thallus obcordate, sparingly forked, increasing by joints; pores conspicuous; gemmæ none. Diœcious or monœcious. Fertile receptacle hemispheric, 1–4-lobed, with as many alternating shorter rib-like rays. Outer involucres attached beneath the lobes, 1–3-fruited, opening outward by an irregular line; perianth obconic-campanulate, angular, unequally 4–5-lobed. Calyptra persistent. Capsule large, distinctly pedicelled, dehiscing by 4–8 revolute segments. Elaters short. Spores coarsely tuberculate. (Named for *L. Preiss*, a German botanist.)

1. **P. commutàta**, Nees. Thallus 1–2′ long, with conspicuous white pores above, and dark purple scales beneath; usually monœcious; peduncle ½–1′ high; capsules conspicuous, dark purple; antheridia in a peduncled disk-like receptacle. (P. hemisphærica, *Cogn.*) — On slaty and limestone rocks, from N. J. north and westward. (Eu.)

## 3. FIMBRIÀRIA, Nees. (Pl. 22.)

Thallus thickened in the middle by a keeled costa, usually conspicuously porose, with dark purple scales beneath; gemmæ none. Monœcious. Receptacle rising from the apex, conic or hemispheric, concave beneath and expanded into usually 4 large campanulate 1-fruited involucres. Perianth oblong-oval or subconic, exserted half its length and cleft into 8–16 fringe-like segments. Calyptra with a long style, fugacious. Capsule nearly sessile, irregularly circumscissile. Elaters rather short, 1–4-spiral. Spores angular, subreticulated. Antheridia immersed in the thallus. (Name from *fimbria*, a fringe, alluding to the perianth.)

1. **F. tenélla**, Nees. Thallus of one or more long-wedge-shaped emarginate divisions about 6–9″ long, grayish-green and porose above, purple on the margins; peduncle 1′ high or more, usually purple; receptacle obtusely conic; perianth white, 8-cleft. — On damp ground in sandy fields or on rocks, central N. Y. to Mo., and southward.

## 4. CONOCÉPHALUS, Neck. (Pl. 22.)

Thallus dichotomous, copiously reticulate and porose, with a narrow costa; gemmæ none. Receptacle conic-mitriform, membranous. Involucres 5–8, tubular, 1-fruited, suspended from the apex of the peduncle; perianth none. Calyptra persistent, campanulate, 2–4-lobed at the apex. Capsule pedicelled, oblong-pyriform, dehiscing by 5–8 revolute segments. Elaters short, thick. Spores muriculate. Antheridia imbedded in an oval disk sessile near the apex of the thallus. (Name from *κῶνος, a cone*, and *κεφαλή, a head*.)

1. **C. cónicus,** Dumort. Thallus 2–6′ long, ½–¾′ wide; receptacle conic, striate, crenate. (Fegatella conica, *Corda.*) — Shady banks; common. (Eu.)

### 5. GRIMÁLDIA, Raddi. (Pl. 23.)

Thallus thick, more or less channelled, dichotomous, innovating from the apex, with thick epidermis, closely areolate and porose-scabrous above, purple and more or less scaly beneath; gemmæ none. Monœcious or diœcious. Receptacle peduncled, hemispherical or conoidal, 3–4-lobed. Involucres as many, 1-fruited, each a distention of the lobe. Capsule filling the involucre, circumscissile in the middle, the calyptra persistent at its base. Antheridia in an oval or obcordate disk immersed in the apex of the thallus. (Named for *D. Grimaldi,* an Italian botanist.)

1. **G. bárbifrons,** Bisch. (Pl. 23.) Thallus linear-obcuneate, 3–6″ long, 1–2″ wide, 2-lobed at the apex, pale green with usually distinct whitish pores, the scales beneath often extending far beyond the margin and becoming whitish; peduncle profusely chaffy at base and apex, sometimes much reduced; antheridial disks obcordate. (Including G. sessilis, *Sulliv.*) — Thin soil on rocks, Conn. and N. J. to Iowa; rare or local. (Eu.)

2. **G. rupéstris,** Lindenb. Thallus 3–6″ long, 1–3″ wide, with membranous margins; receptacle small, hemispherical, 1–4-fruited, the peduncle about 1′ high, sparingly scaly at base, barbulate at the apex; involucre short, crenulate; spores tuberculate. (Duvalia rupestris, *Nees.*) — On calcareous or shaly rocks, N. Y. and Ohio. (Eu.)

### 6. ASTERÉLLA, Beauv. (Pl. 22.)

Thallus rigid, very indistinctly porose, the midrib broad, strong and distinct. Receptacle conic-hemispheric, becoming flattened, 1–6- (usually 4-) lobed. Monœcious. Involucres coherent with the lobes, 1-fruited, 2-valved. Calyptra minute, lacerate, persistent at the base of the capsule. Capsule greenish, rupturing by irregular narrow teeth or by a fragmentary operculum. Elaters moderately long, mostly 2-spiral. Spores tuberculate. Antheridia in sessile lunate disks. (Diminutive of *aster*, a star, from the form of the receptacle.)

1. **A. hemisphǽrica,** Beauv. Thallus forking and increasing by joints, pale green, purple beneath; receptacle papillose on the summit (less so at maturity); peduncle bearded at base and apex, ¾–1′ long, often 2–3 times longer after maturity. (Reboulia hemisphærica, *Raddi.*) — Shaded banks, chiefly along streams; more common southward. — A smaller form or perhaps variety (Reboulia microcephala, *Nees;* R. Sullivantii, *Lehm.*) occurs in Penn., Ohio, and southward. (Eu.)

### 7. DUMORTIÈRA, Nees. (Pl. 22.)

Thallus large, thin, soft, with a slight costa, dichotomous, usually with scattered hair-like rootlets beneath; gemmæ none. Receptacle convex, 2–8-lobed. Involucres 1-fruited, connate with the lobes beneath, horizontal, opening by a vertical terminal slit. Capsule distinctly pedicelled, oblong-globose, dehiscing by 4–6 irregular valves. Elaters 2–3-spiral, parietal, very long, straight, attenuate both ways. Spores muriculate. Antheridia in a short peduncled disk paleaceous beneath. (Named for *B. C. Dumortier*, a Belgian botanist.)

1. **D. hirsùta,** Nees. Thallus 2 – 5′ long, 6 – 9″ wide, deep green, becoming blackish, entire on the margins, naked above or with a delicate appressed pubescence; diœcious; receptacle many-fruited, the margin closely hairy; peduncle rather long, chaffy at the apex. — On moist calcareous rocks, Easton, Penn. (*Porter*), and southward.

### 8. LUNULÀRIA, Micheli. (Pl. 25.)

Thallus oblong with rounded lobes, distinctly areolate and porose, with imbricate sublunate scales beneath; gemmæ in crescent-shaped receptacles. Diœcious. Fertile receptacle usually cruciately divided into 4 horizontal segments or involucres, which are tubular, vertically bilabiate and 1-fruited. Calyptra included, persistent. Capsule exserted, 4 – 8-valved. Elaters short, very slender, mostly free. Spores nearly smooth. Antheridia borne in the apical sinus of the thallus. (Name from *lunula*, a little moon.)

**L.** VULGÀRIS, Raddi. Thallus 1 – 2′ long, forked, innovating from the apex, with a somewhat diffuse costa; peduncle very hairy, 1 – 1½′ long. — Introduced into greenhouses; always sterile, but easily recognized by the characteristic receptacles. (L. cruciata, *Dumort.*) (Int. from Eu.)

## ORDER 140. RICCIÀCEÆ.

Plant-body a dichotomously branching thallus, terrestrial or aquatic. Capsules short-pedicelled, or sessile on the thallus, or immersed in its substance, free or connate with the calyptra, globose, at length rupturing irregularly. Calyptra crowned with a more or less deciduous point. Elaters none. Spores usually angular, reticulate or muriculate. Antheridia ovate, immersed in the thallus in flask-shaped cavities with protruding orifices (*ostioles*).

1. **Riccia.** Capsule immersed in the thallus. Involucre none.
2. **Sphærocarpus.** Capsule sessile on the thallus. Involucre inflated-pyriform.

### 1. RÍCCIA, Micheli. (Pl. 22.)

Thallus at first radiately divided, the centre often soon decaying; the divisions bifid or di – tri-chotomous, flat or depressed or channelled above, usually convex and naked or squamulose beneath; margins naked or spinulose-ciliate; epidermis usually distinct, eporose; air-cavities evident or wanting. Capsule immersed, sessile. Calyptra with a persistent style. Spores alveolate or muriculate, usually flattened and angular. (Named for *P. F. Ricci*, an Italian nobleman, patron of Micheli.)

§ 1. LICHENÒDES. *Fruit mostly protuberant above; spores about* 84μ *broad, issuing through openings in the upper surface of the thallus; terrestrial species (on damp, usually trodden or cultivated ground), without air-cavities.*

* *Thallus naked, without cilia or scales.*

1. **R. Fróstii,** Aust. Thallus orbicular, 6 – 12″ broad, thinnish, grayish-green, the apex and narrowly membranous margins sometimes purplish, minutely pitted; divisions linear or subspatulate, subtruncate and slightly emarginate; rootlets smooth or obsoletely papillose within; capsules very prominent beneath; spores barely 50 μ broad, nearly round, somewhat margined, with depressed sides when dry, fuscous. — Ohio, Ill., and westward.

* * *Thallus with white scales beneath (dark purple in* n. 4), *the margin naked.*

2. **R. sorocárpa,** Bisch. Thallus 3 – 8″ in diameter, pale green becoming whitish, finely reticulate, subradiately or dichotomously divided, the oblong-linear segments subacute, deeply sulcate, with a few inconspicuous scales toward the apex not extending beyond the margin; margins erect when dry; spores issuing through chinks early appearing along the groove above. — Thin rocky soil and cultivated fields, Closter, N. J. (*Austin*), western N. Y. (*Clinton*), and Ill. (*Hall*). (Eu.)

3. **R. lamellòsa,** Raddi. Thallus pale green, elegantly reticulated, subradiately divided, the divisions obovate or obcordate, bifid or 2-lobed, 2 – 5″ long, channelled at the apex, with membranous ascending margins, and furnished beneath with transverse scales which extend considerably beyond the margin; spores much as in n. 2. — Thin rocky soil, Closter, N. J. (*Austin*).

4. **R. nigrélla,** DC. Thallus dichotomously divided, the divisions linear, channelled, with entire narrowly membranous margins, green above, dark purple beneath and furnished with transverse semicircular scales not exceeding the margin. — Rocky ground, N. Y. (*Torrey*), and Chester, Penn. (*Porter*). (Eu.)

* * * *Thallus more or less ciliate, naked beneath or obsoletely squamous along the extreme edge.*

5. **R. arvénsis,** Aust. Thallus much divided, 3 – 9″ broad, papillose-reticulate, dull green both sides, becoming fuscous above, the flat margins at length purple; divisions sulcate, dichotomous, the linear-elliptic or subspatulate lobes acutish and obsoletely emarginate; cilia whitish, very short and inconspicuous or nearly wanting; capsules aggregated toward the apex; spores 71 – 84 μ broad, dark fuscous, reticulate, with pellucid margin. — Var. HÍRTA, Aust., decidedly ciliate and with spine-like hairs scattered over the upper surface; divisions broader, more obtuse; spores nearly black, larger (84 – 101 μ) and smoother. — Cultivated fields and (the var.) rocky places, Closter, N. J. (*Austin*).

6. **R. Lescuriàna,** Aust. Stellately or subcruciately divided, the obcordate or cuneate-linear divisions 2 – 6″ long, punctate-reticulate, subglaucous or ashy-green both sides or becoming purple beneath, the slightly concave lobes emarginate, closely ciliate with short obtuse spine-like white hairs; capsules scattered, chiefly near the base of the divisions; spores 71 – 83 μ broad, dark brown, reticulate, not margined. — Cultivated fields and rocky grounds, N. J. to Ill., and southward.

§ 2. SPONGÒDES. *Thallus with large air-cavities usually opening by pits through the upper surface, and with slight depressions over the capsules which are prominent beneath; spores* 41 – 51 μ *broad, obtusely angular or globose; terrestrial.*

7. **R. crystállina,** L. Orbicular, 6 – 9″ broad, the obcordate or cuneate divisions bifid or 2-lobed, flat above and the surface much broken up into pits, the margins subcrenate; capsules scattered; spores issuing through the upper surface. — On mud flats, Ill. (*Hall*), west and southward. (Eu.)

8. **R. lutéscens,** Schwein. Orbicular, 1 – 1½′ in diameter, light green; divisions 6 – 8, linear, 2 – 3 times forked, narrowly channelled, obcordate and

thickened at the apex, with delicate whitish obliquely ovate appressed scales; rootlets wanting beneath above the middle; fruiting plant unknown. — Dried up pools and ditches, Canada to Mo., and southward. An analogous form has been developed by Lindberg from R. natans.

9. **R. ténuis,** Aust. Thallus thin, olive or yellowish-green, shining, the 2 – 4 divisions roundish-obovate, 2 – 4″ long, flat, with sinuate margins, green beneath with a slender costa and few rootlets; capsule very delicate, closely adherent to the substance of the thallus, minutely apiculate; spores round or short-oval, conspicuously depressed at one end when dry. — Wet ground in open woods, Closter and Lawrence, N. J. (*Austin*), and Mo. (*Hall*).

§ 3. RICCIÉLLA. *Thallus linear, dichotomous, floating or rarely terrestrial; capsule protuberant from the lower surface.*

10. **R. flùitans,** L. Thallus often in extended patches, thin, green, radiately expanding, the often imbricate divisions ½ – 1½″ wide, parallel-nerved, flat, without rootlets, cavernous only toward the slightly dilated very obtuse or subtruncate apex; capsules present only in some terrestrial forms, very prominent below, rupturing beneath the apex. —Very variable. The most notable form is var. SULLIVÁNTI, Aust., with divisions about ½″ wide, channelled, cavernous throughout, the margins crisped-crenulate, and rootlets numerous on the costa tumid with abundant capsules, which are tipped with a long funnel-mouthed point; spores obscurely angled, reticulate and margined. (R. Sullivanti, *Aust.*) — In ponds or ditches or growing in wet places upon the ground; the variety often in cultivated fields. (Eu.)

§ 4. RICCIOCÁRPUS. *Thallus obcordate, floating or rarely terrestrial; capsules not protruding, at length exposed by a cleft in the central groove.*

11. **R. nàtans,** L. (Pl. 22.) Divisions obcordate or cuneate, broadly emarginate, 3 – 6″ long, purplish, very narrowly channelled, with numerous uniform air-cavities beneath the epidermis, rooting toward the base and at length with dark purple scales beneath the apex; capsules in 1 or 2 rows beneath the groove; spores black, angular, strongly papillose. — Canada to the Gulf. (Eu.)

## 2. SPHÆROCÁRPUS, Micheli. (Pl. 22.)

Thallus lobed, without costa or epidermis. Involucres sessile, obconic or pyriform, perforated at the apex, continuous with the thallus at base. Calyptra closely investing the single globose indehiscent capsule, crowned with a deciduous point. Spores globose, muriculate, remaining united in a coccus. Antheridia borne in follicular bodies on the surface of a separate thallus. — An anomalous genus, perhaps more closely related to the Jungermanniaceæ. (Name from σφαῖρος, *a sphere*, and καρπός, *fruit*.)

1. **S. terréstris,** Smith. Thallus orbicular, 3 – 6″ broad, covered by the clustered inflated involucres, which are nearly 1″ long, 3 – 4 times the length of the capsule; coccus 102 – 127μ wide, indistinctly lobed. (S. Michelii, *Bellardi*.) — In cultivated fields, mostly southern. (Eu.)

# ADDITIONS AND CORRECTIONS.

Page 59. — ARGEMONE MEXICANA. Collected at Merodosia, Ill., with white flowers, by *A. B. Seymour*.

Page 75. — Insert after **Cleome integrifolia** —

**C.** SPINÒSA, L. Viscid-pubescent, 3 – 4° high; a pair of short stipular spines under the petiole of each leaf; leaflets 5 – 7, oblong-lanceolate; flowers large, rose-purple to white; stamens 2 – 3′ long; stipe of the linear pod about 2′ long. (C. pungens, *Willd.*) — An escape from cultivation, near Mt. Carmel, Ill. (*Schneck*), and in waste grounds southward; also on ballast. (Int. from Trop. Amer.)

Page 86. — **Arenaria Grœnlandica.** Found on Mt. Desert Island, Maine (*Rand*).

Page 87. — **Stellaria borealis.** In the mountains of northern N. J.

**S. humifusa.** This species has also been found on Cranberry Island, near Mt. Desert, Maine, by *J. H. Redfield*.

Page 91. — Under **Talinum teretifolium** add the character — style equalling the stamens. — Insert

2. **T. calycìnum,** Engelm. Leaves somewhat broader; flowers and capsules larger; stamens 30 or more; style twice longer than the stamens, declined. — Central Kan. to W. Tex.

Under **Claytonia** insert —

3. **C. Chamissònis,** Esch. Weak, procumbent or ascending, rooting below and perennial by lateral and terminal filiform runners; leaves several pairs, oblong-spatulate, 1 – 2′ long; inflorescence racemosely 1 – 9-flowered; petals pale rose-color; capsule small, 1 – 3-seeded. — In a cold ravine, Winona Co., Minn.; in the mountains from Colorado north and westward.

Page 211. — **Hydrocotyle Americana.** Add — propagating by filiform tuberiferous stolons.

Page 230. —Insert after the genus Dipsacus —

## 2. SCABIOSA, Tourn. SCABIOUS.

Characters of Dipsacus, but the green leaves of the involucre and involucels not rigid nor spinescent. (Name from *scabies*, the itch, from its use as a remedy.)

**S.** AUSTRÀLIS, Wulf. Perennial, sparsely branched, nearly glabrous, 1½ – 3° high; leaves narrowly lanceolate to linear, the lower oblanceolate, slightly toothed or entire; heads short-oblong; calyx obtusely short-lobed; corolla pale blue. — Central N. Y. and Penn.; rare. (Adv. from Eu.)

Page 395. — After OROBANCHE MINOR insert —

**O.** RAMÒSA, L. Often branched, 6′ high or less, of a pale straw-color; flowers 3-bracteate, the lateral bracts small; calyx 4-toothed, split at the back; corolla pale blue, 6 – 8″ long. — On the roots of hemp and tobacco; Ky. (Int. from Eu.)

Page 421. — After LAMIUM PURPUREUM insert —

**L.** INTERMÈDIUM, Fries. Resembling L. purpureum, but the calyx-teeth longer than the tube, the rather narrower corolla without a hairy ring within near the base, and the nutlet longer (3 times as long as broad). — Cultivated fields near Hingham, Mass. (*C. J. Sprague*). (Adv. from Eu.)

Page 427. — Insert in the generic key —

5 **Cladothrix.** Flowers perfect, minute, axillary. Densely white-tomentose.

Page 430. — Insert after the genus Frœlichia —

### 5. CLADÓTHRIX, Nutt.

Flowers perfect, 3-bracted. Sepals 5, erect, rigid-scarious, somewhat pilose. Stamens 5, the filaments united at base; anthers large, 1-celled. Stigma large, capitate, 2-lobed. Utricle globose, indehiscent. — Densely stellate-tomentose low herbs or woody at base, with opposite petiolate leaves and very small flowers solitary or few in the axils. (Name from *κλάδος, a branch,* and *θρίξ, hair,* for the branching tomentum.)

1. **C. lanuginòsa,** Nutt. Prostrate or ascending, much branched; leaves round-obovate to rhomboidal, 3 – 10″ long. — Central Kan. (*Meehan*) and southwestward.

Page 435. — **Salsola Kali.** This species has been found in Emmet Co., Iowa (*Cratty*), at Yankton, Dak. (*Bruhin*), and in river-bottoms in N. W. Neb. and central Dak.

Page 437. — After **Eriogonum annuum** insert —

2. **E. Allèni,** Watson. Perennial, white-tomentose throughout, the tall scape-like stem repeatedly dichotomous above; radical leaves lanceolate, long-petiolate, the upper in whorls of 4 or 5, ovate to oblong-ovate, very shortly petiolate, much reduced above; involucres mostly sessile; flowers glabrous, yellow, the segments elliptical. — Near White Sulphur Springs, W. Va. (*T. F. Allen*).

Page 445. — **Asarum Canadense.** In this species there are rudimentary subulate petals, alternate with the calyx-lobes.

Page 463. — **Celtis Mississippiensis.** Common in low river-bottoms of W. Mo. (*F. Bush*); described as having a very smooth trunk, like a sycamore, and soft yellowish brittle wood, not coarse-grained as in C occidentalis.

Page 491. — Under **Pinus** add —

10. **P. ponderòsa,** Dougl., var. **scopulòrum,** Engelm. Leaves in twos or usually threes from long sheaths, 3 – 6′ long, rather rigid; staminate flowers 1′ long; cones subterminal, 2 – 3′ long, oval, often 3 – 5 together, the prominent summit of the thick scales bearing a stout straight or incurved prickle. — Central Neb. and westward in the Rocky Mountains. — A large tree with very thick bark.

Page 514. — After IRIS CAROLINIANA insert —

2ª. **I. hexágona,** Walt. Stems flexuous, often low and slender (1 – 3° high), leafy; leaves much exceeding the stem, 6 – 12″ broad; flowers solitary and sessile in the axils, large, deep blue, variegated with yellow, purple, and white; tube ½′ long; segments about 3′ long, the inner narrow; capsule oblong-cylindric, 6-angled, 2′ long. — Prairies, Ky. (*Short*) to W. Mo. (*Bush*), and on the coast from S. Car. southward.

Page 515. — **S. angustifolium.** What appears to be a form of this species with pale yellow flowers is found near Independence, Mo. (*Bush*).

Page 516. — Under **Zephyranthes Atamasco** insert the synonym (Amaryllis Atamasco, *L.*).

Page 555. — **S. teres** has been collected also at Brewster, Mass. (*Farlow*).

Page 575. — After **E. Torreyana** insert —

13ª. **E. álbida,** Torr. Like n. 12 and 13 in habit, somewhat stouter; spikelet dense, ellipsoidal or oblong, 1 – 4″ long, acutish, with pale obtuse scales; achene very small, triangular-obovate, very smooth, with a broadly triangular tubercle upon a narrow base, shorter than or exceeding the reddish bristles. — Salt marshes, Northampton Co., Va. (*Canby*), and south to Fla. and Tex.

Page 653. — **T. subspicatum,** var **molle,** is reported from Roan Mt., N. C. (*Scribner*), and probably occurs on the higher Alleghanies northward.

Page 662. — After **M. diffusa** insert —

3. **M. Pórteri,** Scribn. Tall and slender; panicle very narrow, the slender branches erect or the lower slightly divergent; pedicels flexuous or recurved, pubescent; glumes very unequal and shorter than the spikelet; fertile flowers 3 – 5, the glumes scabrous. — Mountains of Col. and southward; reported from Cass Co., Neb. (*J. G. Smith*).

Page 663. — **D. maritima.** On alkaline soil in Neb., and very common in similar localities west and southwestward; chiefly the var. STRÍCTA, Thurb., with setaceously convolute leaves, the many- (10 – 20-) flowered spikelets in a loose panicle.

Page 5. — Under * 1 read — (sometimes opposite or whorled, stipulate in Magnoliaceæ and rarely in Ranunculaceæ).

Page 8. — Under **Ilicineæ** read — and usually deciduous stipules.

Page 38. — **A. Pennsylvanica.** Reported from Aroostook Co., Maine (*J. C. Parlin*).

Page 40. — **M. minimus.** Reported from Accomac Co., Va., (*E. Mears*).

Page 41. — **R. ambigens.** An earlier name is *R. laxicaulis*, Darby.

Page 44. — Add — 2. **C. nàtans,** Pall. Stem prostrate or floating; leaves crenulate or entire; sepals oval, 2 – 3″ long, white or pinkish. — Tower, Minn (*E. J. Hill*), and northward.

Page 73. — **L.** RUDERALE. Reported at Buckfield and Orono, Maine (*Parlin*).

Page 75. — **P. graveolens.** Said to range to the Chesapeake (*Porter*).

Add at bottom — **R.** ÁLBA, L. Leaves pinnate, undulate, glaucous; flowers white; sepals and petals 5 or 6, the latter all 3-fid. — Buffalo, N. Y. (*Clinton*); Youngstown, Ohio (*Ingraham*). (Adv. from Eu.)

Page 83. — **D.** DELTOIDES. Read — glabrous or roughish. — On the downs, Martha's Vineyard (*Edith Watson*).

Page 84. — **S. antirrhina.** A very slender form with much smaller apetalous flowers, and capsules only 2″ long, occurs at Rockford, Ill.

Page 85. — **L.** DIURNA. Flowers sometimes white.

Page 87. — Under **S. uliginosa** read — veiny, often ciliate at base.

Page 89. — **S. procumbens.** Leaves linear-lanceolate to narrowly linear. — Champion Mine, Marquette Co., Mich. (*E. J. Hill*).

Page 95. — Under genus 3 read — with small usually rather close clusters.

Page 99. — **M. angustum.** Also found in W. Ill. along the Mississippi. Under **S. Napæa** read — along and near the Alleghanies.

Page 107. — Under ORDER 25 insert — Stipules small or minute, usually soon deciduous. — Add — The *Aquifoliaceæ* of previous editions.

Page 108. — **I. mollis.** Common on the Pocono plateau, Penn. (*Porter*).

Page 127. — **C.** SCOPARIUS. At Osterville, Mass. (*Miss S. Minns*).

Page 140. — **D. sessilifolium.** Also at Norwich, Conn. (*Graves*), and in Plymouth Co., Mass. (*Boott*).

Page 152. — **P.** SPINOSA. The garden Plum, a thornless derivative from var. INSITITIA, rarely occurs as an escape. — Add — **P.** ÀVIUM, L., the Bird Cherry, with drooping pubescent acutely serrate leaves on long petioles, lax spreading petals, and sweet fruit—and **P.** CÉRASUS, L., the garden Cherry, with spreading glabrous crenate-serrate leaves on short petioles, firm suberect petals, and acid fruit — are found by roadsides, etc., in N. Y. and Penn.

Page 155. — To **R. Canadensis** add — Var. **roribáccus,** Bailey. Leaflets triangular-ovate, unequally and sharply doubly serrate, often nearly lobed; peduncles longer and straighter, overtopping the leaves; flowers very large, 1-2′ broad, the sepals foliaceous and incised; fruit large. — W. Va., and probably southward. Cultivated as the *Lucretia Dewberry.*

Page 159. — After **P. Pennsylvanica** insert — **P.** RÉCTA, L. A tall herbaceous perennial, sparsely villous and glandular-puberulent, with digitate 5-7-foliolate leaves, incisely pinnatifid leaflets, and large yellow flowers in a broad cyme. — Central N. Y. (Introd. from Eu.)

Page 164. — Add — **R.** CINNAMÒMEA, L. (CINNAMON ROSE.) With brownish-red bark, some straightish prickles, pale leaves downy beneath, and small double pale-red flowers. — An escape about old gardens and by roadsides. — N. Eng., N. Y., etc.

Insert — **P.** MÀLUS, L., the Apple, and much more rarely the Pear, **P.** COMMÙNIS, L., occur self-sown in pastures, etc.

Page 176. — **R. rubrum.** The garden form sometimes occurs as an escape.

Page 177. — In the last line read — from western N. Y. to Ga. and S. Ind.

Page 181. — **M. scabratum.** Keweenaw Co., Mich. (*O. A. Farwell*).

Page 185. — Under **A. coccinea** read — west to S. Ind., N. Ill., Kan., etc. Add — 2. **A. auriculàta,** Willd. Flowers smaller, in loose peduncled axillary cymes; capsule 1″ in diameter. (A. Wrightii, *Gray.*) — Fillmore Co., Neb. (*Rev. J. H. Wibbe*). A Texan species, perhaps introduced. Under **L.** SALICARIA add — and central N. Y.

Page 201. — **D.** CAROTA. Flowers occasionally purple or reddish.

Page 207. — Under **B. angustifolia** read — Mass. (?), Mich., N. Ill., and westward.

Page 214. — **C. circinata.** Calyx-teeth minute; stone globular, not furrowed. — **C. sericea.** Stone large, more or less acute at base, oblique and irregularly sharp-ridged. — **C. asperifolia.** Stone nearly globular or somewhat oblique, smooth or slightly furrowed. — **C. stolonifera.** Stone very variable, oblique, flattened or scarcely so, more or less furrowed. — **C. stricta.** Stone small, nearly globular, smooth. This species appears to include *C. paniculata*. *C. candidissima*, Marsh., is a little earlier name, but the identification is somewhat doubtful. — Add —

5$^a$. **C. Bàileyi,** Coult. & Evans. Intermediate between nos. 5 and 6 in foliage and pubescence; branches reddish-brown; fruit white; stone compressed, truncate, furrowed on the prominent edges, broader than high. — About the Great Lakes (Erie to Superior) and westward. Perhaps a hybrid.

Page 215. — Add 1$^a$. **N. biflòra,** Walt. Leaves smaller than is usual in n. 1 (1–3′ long); fertile flowers 1–3; stone decidedly flattened and more strongly furrowed. — N. J. to Fla., Tenn. and southward.

Page 226. — **G.** MOLLUGO. Occurs in eastern N. Eng. — Flowers in this species loosely panicled, in **G.** VERUM densely so.

Page 233. — Enter — 43$^a$. **Franseria.** As Ambrosia, but fruit 1–4-celled, 1–4-beaked.

Page 250. — **S. neglecta,** var. **linoides.** At Turner, Maine (*J. A. Allen*).

Page 252. — **S. Ohioensis.** Read — central N. Y., and from Ohio to Wisc.

Page 269. — **G. purpureum.** At Youngstown, Ohio (*R. H. Ingraham*).

Page 273. — Add — 43$^a$. **FRANSÈRIA,** Cav.

Resembling Ambrosia, but the fertile involucre enclosing 1–4 flowers, the fruit 1–4-celled and 1–4-beaked, more or less bur-like with scattered prickles. (Named for *A. Franser*, a Spanish botanist.)

1. **F. tomentòsa,** Gray. Low, erect and rather stout, densely silky-tomentose; leaves very white beneath, more or less pinnately cleft or nearly entire. — Macpherson, Kan. (*Kellerman*), and southwestward.

Page 275. — **H. scabra.** Reported from Oxford Co., Maine (*Parlin*).

Page 284. — **B. connata,** var. COMOSA. Reported from central N. Y. (*Dudley*).

Page 297. — Under **C.** NIGRA read — black or brown pectinately-ciliate fringe; *rays* usually *wanting*.

Page 302. — **P. altissima.** Glabrous or somewhat hispidulous.

Page 320. — Under **R. nudiflorum** read — Swamps and open woods.

Page 329. — Under **D. Meadia** add — Var. **Frénchii,** Vasey. Often dwarf, glabrous or pubescent above; leaves ovate or ovate-elliptical, sometimes cordate at base. — Penn. to S. Ill. and Ark.

Page 354. — **L. trachyspermum.** Reported from southern N. J. (*Britton*).

Page 361. — ASPERUGO PROCUMBENS. At New Bedford, Mass. (*Hervey*).

Page 378. — Enter — 7$^a$. **Paulownia.** Corolla tubular with spreading limb. Sterile stamen none. Seeds winged. A Catalpa-like tree.

Page 382. — **P. albidus.** Reported from S. W. Minn. (*McMillan*).

Add — **7a. PAULÒWNIA,** Sieb. & Zucc.

Calyx deeply 5-cleft, woolly. Corolla declined, funnelform, with 5 rounded obliquely spreading lobes. Stamens 4, included. Pod turgid, thick, loculicidal. Seeds small, winged. — A tree with large opposite cordate entire or 3-lobed pubescent leaves, and large terminal panicles of showy violet flowers. (Named for *Anna Paulowna*, daughter of Czar Paul I.)

**P.** IMPERIÀLIS, Sieb. & Zucc. A handsome tree resembling the Catalpa; cult. from Japan. — Growing wild in N. J. and Del.

Page 388. — **B. Americana.** Also found in S. E. Penn. and southward.

Page 391. — Add — 1a. **C. indivìsa,** Engelm. Winter-annual; leaves linear-lanceolate, entire or with 2 or 3 slender lateral lobes; bracts and calyx-lobes obovate, bright red. — Shannon Co., Mo. (*S. M. Tracy*). May – June.

Page 396. — **U. clandestina.** Reported from mountain bogs, central Penn. (*Porter*).

Page 397. — **U. resupinata.** Reported from Lake Co., Ind. (*Hill*), and Ionia Co., Mich.

Page 401. — Add — 3. **R. pedunculàta,** Torr. Slightly puberulent; leaves ovate-oblong, short-petioled; peduncles axillary, about as long as the leaf, 1 – 3-flowered, bracteate; calyx-lobes about equalling the narrow corolla tube. — Jefferson Co., Mo. (*Hasse*), and south to La.

Page 405. — **T. dichotomum.** Western Maine (*Parlin*).

Page 419. — **P. Virginiana.** At Hanover, Maine (*Parlin*).

Page 426 — **P. argyrocoma.** Whitecap Mt., Oxford Co., Maine (*Parlin*).

Page 487. — **P. heterophylla.** This has 3-valved capsules and large seeds, and probably dilated styles — and should therefore be placed in § 2.

Page 502. — **S. Romanzoffiana.** Reported from N. W. Penn. (*Porter*).

Page 505. — **P. affinis.** Also reported from E. Penn. (*Porter*).

Page 525. — Under genus **13** read — ; cells 1 – 2-seeded.

Page 529. — Under **L. Canadense** read — flowers 1 – 16, usually few.

Page 543. — **J. pelocarpus,** var. SUBTILIS. Lake Hopatcong, N. J.

Page 544. — **J. acuminatus,** var. **debilis.** At Rumford, Maine (*Parlin*).

Page 545. — Under **J. scirpoides** read — Mich., Ind., Mo., and Tex.

Page 563. — Under **P. Hillii** read — Mich., northern Ohio, and western N. Y. — **P. obtusifolius.** Reported from Tower, Minn. (*Hill*).

Page 564. — **P. Tuckermani.** Reported from eastern and central Penn. (*Porter*). *P. confervoides*, Reichenb., appears to be an earlier name. — **P. Robbinsii.** Reported from Lake Co., Ind., Marquette Co., Mich., and Chesago Lake, E. Minn. (*Hill*).

Page 574. — Under **E. Engelmanni,** for E. obtusa, read E. Engelmanni.

Page 577. — **F. spadicea.** Also in Kankakee, Henderson and St. Clair Cos., Ill. (*Hill*).

Page 589. — Under ← 4. *Cryptocarpæ* read — stigmas 2 or 3.

Page 590. — Under * 7 add — ← 1a. *Filifoliæ.* Spike one, androgynous.

Page 599. — For **C. vulgaris,** Fries, read — **C. rígida,** Gooden., var. **Goodenòvii,** Bailey — and at end insert — (C. vulgaris, *Fries.*). — For Var. **hyperborea,** Boott, read — Var. **Bigelòvii,** Tuckerm., — and at end substitute the synonym — (C. vulgaris, var. hyperborea, *Boott.*).

Page 601. — Add — 41a. **C. verrucòsa,** Muhl. Glaucous, stout and stiff, 2 – 4° high; leaves long, rough-angled, becoming revolute; spikes 3 – 10, stout, scattered to loosely aggregated, then erect or ascending, usually somewhat staminate above, variously peduncled; scales thin, brown, emarginate, shorter than the broadly ovate or obovate strongly few-nerved glaucous perigynium, but the hispid awn from 2 – 3 times longer to nearly obsolete; beak short, entire; stigmas 3. (C. glaucescens, *Ell.*) — Swamps and ponds; extreme southern Va., Mo., and southward.

Page 606. — **C. Torreyi.** Found in Hennepin Co., Minn. (*Sandberg*).

Page 611. — Add — ∗ 7. — ⊹ $1^{a}$. *Filifoliæ.*

$84^{a}$. **C. filifòlia,** Nutt. Culm slender, obtusely angled, smooth, 3 – 12′ high; leaves filiform, rigid; perigynium broadly triangular-obovoid, thin, with a short white-hyaline entire beak, usually about equalling the broad hyaline-margined clasping scale. — Ft. Lincoln, N. Dak. (*Havard*), and westward.

Page 626. — Under 69. **Festuca** read — tip (rarely blunt), few-nerved.

Page 635. — **L. oryzoides.** Reported as common in Oxford Co., Maine (*Parlin*). — **Z. miliacea.** Reported at Poconoke City, Md. (*E. Mears*).

Page 646. — **S. heterolepis.** Reported from S. E. Penn. (*Porter*).

Page 650. — **C. Porteri.** Reported from Tompkins Co., N. Y. (*Dudley*).

Page 651. — **A. arundinacea.** Reported at Ocean City, Md (*Mears*).

Page 652. — Under genus **37** read — in a contracted or open. — **A. caryophyllea.** Lower flowers sometimes awnless. Accomac Co., Va. (*Mears*).

Page 653. — **A. striata.** Reported from N. Penn. (*Porter*). — **T. palustre.** Occurs in southern Conn.

Page 657. — **T. cuprea.** Occurs in southern Conn.

Page 658. — **D. fascicularis.** In saline localities in central N. Y. (*Dudley*).

Page 659. — **E. obtusata.** Read — central N. Y. to Fla., etc.

Page 677. — **E. littorale.** Banks of the Susquehanna, Penn.

Page 682. — **P. gracilis.** Found in Lycoming and Sullivan Cos., Penn., and in Iowa.

Page 683. — **W. angustifolia.** Reported from S. Haven, Mich. (*Bailey*).

Page 694. — **B. simplex.** Reported from Pocono Mt., Penn. (*Porter*), and Ellicott's Mills, Md. (*J. B. Egerton*).

Page 695. — **L. Selago.** Add — and south in the mountains to Ga.

Page 698. — Substitute — ∗ ∗ *Leaves in 4 ranks, two lateral and spreading, and two above, which are smaller and ascending.*

Page 700. — Var. **valida.** On Salt Pond Mt., Va., in wet ground (*Canby*).

Page 734. — **Salsola Kali.** At Madison, Wisc.; introduced (*L. S. Cheney*).

In the Index add — *AQUIFOLIACEÆ*, 107 — Asimina, 50 — Franseria, $735^{b}$ — Pastinaca, 202 — Paulownia, $735^{c}$ — Prunus, 151.

NOTE. — "Western New York," as used throughout the Manual, is to be understood as including the lake-region of central New York.

Several additional species are reported as rarely escaped or as growing wild in cemeteries, about old gardens or deserted homesteads, etc., — as *Lunaria biennis*, Moench, Honesty or Satin-flower — *Lychnis Coronaria*, L., Mullein Pink — *Levisticum officinale*, Koch, Lovage — *Lonicera Xylosteum*, L., and *L. Tatarica*, L., Honeysuckles — *Valeriana officinalis*, L., Valerian — *Artemisia Abrotanum*, L., Southernwood — *Vinca minor*, L., Periwinkle, etc.

# LIST OF ORDERS,

## WITH THE NUMBER OF GENERA AND SPECIES, NATIVE AND INTRODUCED.

| ANGIOSPERMOUS EXOGENS. | Genera. | | Species. | |
|---|---|---|---|---|
| DIV. 1. POLYPETALOUS. | Native. | Introd. | Native. | Introd. |
| 1. Ranunculaceæ | 19 | 5 | 62 | 14 |
| 2. Magnoliaceæ | 2 | — | 6 | — |
| 3. Anonaceæ | 1 | — | 1 | — |
| 4. Menispermaceæ | 3 | — | 3 | — |
| 5. Berberidaceæ | 5 | — | 5 | 1 |
| 6. Nymphæaceæ | 5 | — | 8 | — |
| 7. Sarraceniaceæ | 1 | — | 2 | — |
| 8. Papaveraceæ | 3 | 3 | 3 | 6 |
| 9. Fumariaceæ | 3 | 1 | 9 | 1 |
| 10. Cruciferæ | 15 | 8 | 46 | 25 |
| 11. Capparidaceæ | 3 | — | 4 | 1 |
| 12. Resedaceæ | — | 1 | — | 2 |
| 13. Cistaceæ | 3 | — | 9 | — |
| 14. Violaceæ | 3 | — | 19 | 1 |
| 15. Caryophyllaceæ | 6 | 6 | 31 | 22 |
| 16. Portulacaceæ | 3 | — | 7 | 1 |
| 17. Elatinaceæ | 1 | — | 3 | — |
| 18. Hypericaceæ | 3 | — | 20 | 1 |
| 19. Ternstrœmiaceæ | 2 | — | 3 | — |
| 20. Malvaceæ | 7 | 4 | 15 | 10 |
| 21. Tiliaceæ | 1 | — | 3 | — |
| 22. Linaceæ | 1 | — | 5 | 1 |
| 23. Geraniaceæ | 4 | 1 | 10 | 7 |
| 24. Rutaceæ | 2 | — | 3 | — |
| 25. Ilicineæ | 2 | — | 10 | — |
| 26 Celastraceæ | 3 | — | 4 | — |
| 27. Rhamnaceæ | 3 | — | 6 | 1 |
| 28. Vitaceæ | 3 | — | 11 | — |
| 29. Sapindaceæ | 5 | — | 11 | — |
| 30. Anacardiaceæ | 1 | — | 7 | — |
| 31. Polygalaceæ | 1 | — | 15 | — |
| 32. Leguminosæ | 41 | 5 | 137 | 19 |
| 33. Rosaceæ | 17 | 1 | 87 | 8 |
| 34. Calycanthaceæ | 1 | — | 3 | — |
| 35. Saxifragaceæ | 14 | — | 43 | 1 |
| 36. Crassulaceæ | 3 | — | 8 | 3 |
| 37. Droseraceæ | 1 | — | 4 | — |
| 38. Hamamelideæ | 3 | — | 3 | — |
| 39. Halorageæ | 4 | — | 13 | — |
| 40. Melastomaceæ | 1 | — | 4 | — |
| 41. Lythraceæ | 6 | — | 8 | 1 |
| 42. Onagraceæ | 7 | — | 43 | 1 |
| 43. Loasaceæ | 1 | — | 3 | — |
| 44. Passifloraceæ | 1 | — | 2 | — |
| 45. Cucurbitaceæ | 5 | — | 5 | — |
| 46. Cactaceæ | 2 | — | 6 | — |
| 47. Ficoideæ | 1 | 1 | 1 | 1 |
| 48. Umbelliferæ | 26 | 10 | 49 | 13 |
| 49. Araliaceæ | 1 | — | 6 | — |
| 50. Cornaceæ | 2 | — | 11 | — |
| | 251 | 46 | 777 | 141 |

| ANGIOSPERMOUS EXOGENS. | Genera. | | Species. | |
|---|---|---|---|---|
| DIV. 2. GAMOPETALOUS. | Native. | Introd. | Native. | Introd. |
| 51. Caprifoliaceæ | 8 | — | 31 | — |
| 52. Rubiaceæ | 7 | 1 | 25 | 5 |
| 53. Valerianaceæ | 2 | — | 7 | 1 |
| 54 Dipsaceæ | — | 2 | — | 3 |
| 55. Compositæ | 78 | 20 | 356 | 51 |
| 56. Lobeliaceæ | 1 | — | 13 | — |
| 57. Campanulaceæ | 2 | — | 6 | 2 |
| 58. Ericaceæ | 26 | — | 69 | — |
| 59. Diapensiaceæ | 3 | — | 3 | — |
| 60. Plumbaginaceæ | 1 | — | 2 | — |
| 61. Primulaceæ | 10 | 1 | 16 | 3 |
| 62. Sapotaceæ | 1 | — | 2 | — |
| 63. Ebenaceæ | 1 | — | 1 | — |
| 64. Styraceæ | 3 | — | 5 | — |
| 65. Oleaceæ | 3 | 1 | 8 | 1 |
| 66. Apocynaceæ | 3 | — | 4 | — |
| 67. Asclepiadaceæ | 5 | 1 | 29 | 1 |
| 68. Loganiaceæ | 4 | — | 4 | — |
| 69. Gentianaceæ | 9 | 1 | 31 | 3 |
| 70. Polemoniaceæ | 3 | — | 14 | — |
| 71. Hydrophyllaceæ | 5 | — | 13 | — |
| 72. Borraginaceæ | 8 | 3 | 22 | 11 |
| 73. Convolvulaceæ | 6 | — | 20 | 7 |
| 74. Solanaceæ | 3 | 5 | 14 | 8 |
| 75. Scrophulariaceæ | 24 | 3 | 66 | 15 |
| 76. Orobanchaceæ | 3 | 1 | 5 | 2 |
| 77. Lentibulariaceæ | 2 | — | 13 | — |
| 78. Bignoniaceæ | 3 | — | 3 | — |
| 79. Pedaliaceæ | 1 | — | 1 | — |
| 80. Acanthaceæ | 3 | — | 4 | — |
| 81. Verbenaceæ | 4 | — | 11 | 1 |
| 82. Labiatæ | 20 | 14 | 65 | 33 |
| 83. Plantaginaceæ | 2 | — | 11 | 1 |
| | 254 | 53 | 874 | 148 |
| DIV. 3. APETALOUS. | | | | |
| 84. Nyctaginaceæ | 2 | — | 41 | — |
| 85. Illecebraceæ | 2 | 1 | 5 | 1 |
| 86. Amarantaceæ | 4 | — | 9 | 7 |
| 87. Chenopodiaceæ | 8 | 2 | 17 | 11 |
| 88. Phytolaccaceæ | 1 | — | 1 | — |
| 89. Polygonaceæ | 6 | 1 | 33 | 13 |
| 90. Podostemaceæ | 1 | — | 1 | — |
| 91. Aristolochiaceæ | 2 | — | 6 | 1 |
| 92. Piperaceæ | 1 | — | 1 | — |
| 93. Lauraceæ | 4 | — | 5 | — |
| 94. Thymelæaceæ | 1 | 1 | 1 | 1 |
| 95. Elæagnaceæ | 2 | — | 3 | — |
| 96. Loranthaceæ | 2 | — | 2 | — |
| 97. Santalaceæ | 2 | — | 4 | — |
| 98. Euphorbiaceæ | 10 | 1 | 34 | 8 |

| ANGIOSPERMOUS EXOGENS.<br>Div. 3. — *Continued.* | Genera. | | Species. | |
|---|---|---|---|---|
| | Native. | Introd. | Native. | Introd. |
| 99. Urticaceæ . . . | 11 | 1 | 16 | 4 |
| 100. Platanaceæ . . . | 1 | — | 1 | — |
| 101. Juglandaceæ . . | 2 | — | 9 | — |
| 102. Myricaceæ . . . | 1 | — | 3 | — |
| 103. Cupuliferæ . . . | 8 | — | 37 | — |
| 104. Salicaceæ . . . | 2 | — | 25 | 5 |
| 105. Empetraceæ . . | 2 | — | 2 | — |
| 106. Ceratophyllaceæ . | 1 | — | 1 | — |
| | 76 | 7 | 257 | 51 |
| GYMNOSPERMOUS EXOGENS. | | | | |
| 107. Coniferæ . . . | 10 | — | 22 | — |
| ENDOGENS. | | | | |
| 108. Hydrocharidaceæ . | 3 | — | 3 | — |
| 109. Burmanniaceæ . | 1 | — | 1 | — |
| 110. Orchidaceæ . . . | 17 | — | 58 | — |
| 111. Bromeliaceæ . . | 1 | — | 1 | — |
| 112. Hæmodoraceæ . . | 3 | — | 4 | — |
| 113. Iridaceæ . . . . | 3 | 1 | 10 | 2 |
| 114. Amaryllidaceæ . | 4 | — | 4 | — |
| 115. Dioscoreaceæ . | 1 | — | 1 | — |
| 116. Liliaceæ . . . . | 29 | 4 | 74 | 8 |
| 117. Pontederiaceæ . . | 2 | — | 4 | — |
| 118. Xyridaceæ . . . | 1 | — | 4 | — |
| 119. Mayaceæ . . . | 1 | — | 1 | — |
| 120. Commelinaceæ . | 2 | — | 6 | — |
| 121. Juncaceæ . . . | 2 | — | 32 | — |
| 122. Typhaceæ . . . | 2 | — | 5 | — |
| 123. Araceæ . . . . | 6 | — | 8 | — |
| 124. Lemnaceæ . . . | 3 | — | 9 | — |
| 125. Alismaceæ . . . | 3 | — | 11 | — |
| 126. Naiadaceæ . . . | 7 | — | 39 | — |
| 127. Eriocauleæ . . . | 3 | — | 5 | — |
| 128. Cyperaceæ . . . | 16 | — | 237 | 8 |
| 129. Gramineæ . . . | 60 | 17 | 204 | 46 |
| | 170 | 22 | 721 | 64 |

| PTERIDOPHYTES. | Genera. | | Species. | |
|---|---|---|---|---|
| | Native. | Introd. | Native. | Introd. |
| 130. Equisetaceæ . . | 1 | — | 11 | — |
| 131. Filices . . . . | 21 | — | 62 | — |
| 132. Ophioglossaceæ . | 2 | — | 7 | — |
| 133. Lycopodiaceæ . . | 1 | — | 9 | — |
| 134. Selaginellaceæ . | 2 | — | 10 | — |
| 135. Marsiliaceæ . . . | 1 | — | 2 | — |
| 136. Salviniaceæ . . . | 1 | — | 1 | — |
| | 29 | | 102 | |
| BRYOPHYTES.<br>Div. Hepaticæ. | | | | |
| 137. Jungermanniaceæ | 32 | 1 | 115 | 1 |
| 138. Anthocerotaceæ | 2 | — | 4 | — |
| 139. Marchantiaceæ . | 8 | — | 9 | — |
| 140. Ricciaceæ . . . | 2 | — | 12 | — |
| | 44 | 1 | 140 | 1 |
| Exogens. | | | | |
| Polypetalous . . . | 251 | 46 | 777 | 141 |
| Gamopetalous . . . | 254 | 53 | 874 | 148 |
| Apetalous . . . . | 76 | 7 | 257 | 51 |
| | 581 | 106 | 1908 | 340 |
| Gymnospermous . . | 10 | — | 22 | — |
| Endogens . . . . . | 170 | 22 | 721 | 64 |
| Total Phænogams . . | 761 | 128 | 2651 | 404 |
| Cryptogams . . . . | 73 | 1 | 242 | 1 |
| | 834 | 129 | 2893 | 405 |

| | |
|---|---|
| Total of Genera . . . | 963 |
| Total of Species . . . | 3298 |

# GLOSSARY.

*Abnormal.* Differing from the normal or usual structure.

*Abortion.* Imperfect development or non-development of an organ.

*Abortive.* Defective or barren.

*Acaulescent.* Stemless or apparently so.

*Accumbent* (cotyledon). Having the edges against the radicle.

*Acerb.* Sour and astringent.

*Achene.* A small, dry and hard, 1-celled, 1-seeded, indehiscent fruit.

*Achlamydeous.* Without calyx or corolla.

*Acicular.* Slender needle-shaped.

*Acrogenous.* Growing from the apex by a terminal bud or by the apical cell only.

*Aculeate.* Prickly; beset with prickles.

*Aculeolate.* Beset with diminutive prickles.

*Acuminate.* Tapering at the end.

*Acute.* Terminating with a sharp or well-defined angle.

*Æstivation.* The arrangement of the parts of the perianth in the bud.

*Adnate.* United, as the inferior ovary with the calyx-tube. *Adnate anther*, one attached for its whole length to the inner or outer face of the filament.

*Adventive.* Recently or imperfectly naturalized.

*Alate.* Winged.

*Albumen.* Any deposit of nutritive material accompanying the embryo.

*Albuminous.* Having albumen.

*Alliaceous.* Having the smell or taste of garlic.

*Alternate.* Not opposite to each other, as sepals and petals, or as leaves upon a stem.

*Alveolate.* Honeycombed; having angular depressions separated by thin partitions.

*Ament.* A catkin, or peculiar scaly unisexual spike.

*Amphitropous* (ovule or seed). Half-inverted and straight, with the hilum lateral.

*Amplexicaul.* Clasping the stem.

*Anastomosing.* Connecting by cross-veins and forming a network.

*Anatropous* (ovule). Inverted and straight, with the micropyle next the hilum and the radicle consequently inferior.

*Androgynous* (inflorescence). Composed of both staminate and pistillate flowers.

*-androus.* In composition, having stamens.

*Angiospermous.* Having the seeds borne within a pericarp.

*Annual.* Of only one year's duration. *Winter annual*, a plant from autumn-sown seed which blooms and fruits in the following spring.

*Annular.* In the form of a ring.

*Anterior.* On the front side of a flower and next the bract, remote from the axis of inflorescence; equivalent to inferior and (less properly) exterior.

*Anther.* The polliniferous part of a stamen.

*Antheridium.* In Cryptogams, the organ corresponding to an anther.

*Antheriferous.* Anther-bearing.

*Antherizoid.* One of the minute organs developed in an antheridium, corresponding to pollen-grains.

*Anthesis.* The time of expansion of a flower.

*Apetalous.* Having no petals.

*Apical.* Situated at the apex or tip.

*Apiculate.* Ending in a short pointed tip.

*Appressed.* Lying close and flat against.

*Aquatic.* Growing in water.

*Arachnoid.* Cobwebby; of slender entangled hairs.

*Archegonium.* The organ corresponding to a pistil in the higher Cryptogams.

*Arcuate.* Moderately curved.

*Areolate.* Marked out into small spaces; reticulate.

*Aril.* An appendage growing at or about the hilum of a seed.

*Arillate.* Having an aril.

*Articulate.* Jointed; having a node or joint.

*Ascending.* Rising somewhat obliquely, or curving upward. *Ascending ovule*, one that is attached above the base of the ovary and is directed upward.

*Assurgent.* Ascending.

*Attenuate.* Slenderly tapering; becoming very narrow.

*Auricle.* An ear-shaped appendage.

*Auriculate.* Furnished with auricles.

*Awl-shaped.* Narrowed upward from the base to a slender or rigid point.

*Awn.* A bristle-shaped appendage.

*Axil.* The angle formed by a leaf or branch with the stem.

*Axile.* Situated in the axis.

*Axillary.* Situated in an axil.

*Axis.* The central line of any organ or support of a group of organs; a stem, etc.

*Baccate.* Berry-like; pulpy throughout.

*Barbed.* Furnished with rigid points or short bristles, usually reflexed like the barb of a fish-hook.

*Barbellate.* Finely barbed.

*Barbulate.* Finely bearded.

*Basal*, *Basilar.* At or pertaining to the base.

*Basifixed.* Attached by the base.

*Beaked.* Ending in a beak or prolonged tip.

*Bearded.* Bearing a long awn, or furnished with long or stiff hairs.

*Berry.* A fruit the whole pericarp of which is fleshy or pulpy.

*Bi-* or *Bis-.* A Latin prefix signifying two, twice, or doubly.

*Bidentate.* Having two teeth.

*Biennial.* Of two years' duration.

*Bifid.* Two-cleft.

*Bilabiate.* Two-lipped.

*Bilocellate.* Having two secondary cells.

*Bilocular.* Two-celled.

*Bisexual.* Having both stamens and pistils.

*Bladdery.* Thin and inflated.

*Blade.* The limb or expanded portion of a leaf, etc.

*Bract.* A more or less modified leaf subtending a flower or belonging to an inflorescence, or sometimes cauline.

*Bracteate.* Having bracts.

*Bracteolate.* Having bractlets.

*Bracteose.* With numerous or conspicuous bracts.

*Bractlet.* A secondary bract, as one upon the pedicel of a flower.

*Bristle.* A stiff hair or any similar outgrowth.

*Bud.* The rudimentary state of a stem or branch; an unexpanded flower.

*Bulb.* A subterranean leaf-bud with fleshy scales or coats.

*Bulbiferous.* Bearing bulbs.

*Bulblet.* A small bulb, especially one borne upon the stem.

*Bulbous.* Having the character of a bulb.

*Caducous.* Falling off very early.

*Calcarate.* Produced into or having a spur.

*Callus.* A hard protuberance or callosity.

*Calyculate.* Having bracts around the calyx imitating an outer calyx.

*Calyptra.* The membranous hood or covering of the capsule in Hepaticæ and Mosses.

*Calyx.* The outer perianth of the flower.

*Campanulate.* Bell-shaped; cup-shaped with a broad base.

*Campylospermous.* Having seeds with longitudinally involute margins, as in some Umbelliferæ.

*Campylotropous* (ovule or seed). So curved as to bring the apex and base nearly together.

*Canaliculate.* Longitudinally channelled.

*Canescent.* Hoary with gray pubescence.

*Capitate.* Shaped like a head; collected into a head or dense cluster

*Capitellate.* Collected into a small head.

*Capsular.* Belonging to or of the nature of a capsule.

*Capsule.* A dry dehiscent fruit composed of more than one carpel; the spore-case of Hepaticæ, etc.

*Capsuliferous.* Capsule-bearing.

*Carinate.* Having a keel or a projecting longitudinal medial line on the lower surface.

*Carpel.* A simple pistil, or one member of a compound pistil.

*Cartilaginous.* Of the texture of cartilage; firm and tough.

*Caruncle.* An excrescence or appendage at or about the hilum of a seed.

*Carunculate.* Having a caruncle.

*Caryopsis.* A grain, as of grasses; a seed-like fruit with a thin pericarp adnate to the contained seed.

*Castaneous.* Of a chestnut color; brown.

*Catkin.* An ament.

*Caudate.* Having a slender tail-like appendage.

*Caudex.* The persistent base of an otherwise annual herbaceous stem.

*Caulescent.* Having a manifest stem.

*Cauline.* Belonging to the stem.

*Cavernous* Hollow; full of air-cavities.

*Cell.* One of the minute vesicles, of very various forms, of which plants are formed. Any structure containing a cavity, as the cells of an anther, ovary, etc.

*Cellular* (tissue). Composed of short transparent thin-walled cells, in distinction from fibrous or vascular.

*Cespitose.* Growing in tufts; forming mats or turf.

*Chaff.* A small thin scale or bract, becoming dry and membranous.

*Chaffy.* Having or resembling chaff.

*Channelled.* Deeply grooved longitudinally, like a gutter.

*Chartaceous.* Having the texture of writing-paper.

*Chlorophyll.* The green grains within the cells of plants.

*Chlorophyllose.* Containing chlorophyll.

*Ciliate.* Marginally fringed with hairs.

*Ciliolate.* Minutely ciliate.

*Cinereous* Ash-color.

*Circinate.* Coiled from the top downward, as the young frond of a fern.

*Circumscissile.* Dehiscing by a regular transverse circular line of division.

*Clavate.* Club-shaped; gradually thickened upward.

*Cleistogamous.* Fertilized in the bud, without the opening of the flower.

*Cleft.* Cut about to the middle.

*Climbing.* Ascending by laying hold of surrounding objects for support.

*Cluster.* Any assemblage of flowers on a plant.

*Clustered.* Collected in a bunch of any sort.

*Coalescence.* The union of parts or organs of the same kind.

*Coccus* (pl. *Cocci*). One of the parts into which a lobed fruit with 1-seeded cells splits.

*Cochleate.* Spiral, like a snail-shell.

*Cohesion.* The union of one organ with another.

*Columella.* The persistent axis of some capsules, spore-cases, etc.

*Columnar.* Like a column.

*Commissure.* The surface by which one carpel joins another, as in the Umbelliferæ.

*Comose.* Furnished with a *coma* or tuft of hairs.

*Complicate.* Folded upon itself.

*Compound.* Composed of 2 or more similar parts united into one whole. *Compound leaf*, one divided into separate leaflets.

*Compressed.* Flattened laterally.

*Conceptacle.* In some Cryptogams a case or receptacle containing the organs of fructification.

*Conduplicate.* Folded together lengthwise.

*Confluent.* Running into each other; blended into one.

*Coniferous.* Cone-bearing.

*Connate.* United congenitally.

*Connective.* The portion of a stamen which connects the two cells of the anther.

*Connivent.* Coming into contact; converging.

*Conoidal.* Nearly conical.

*Convergent.* Approaching each other.

*Convolute.* Rolled up longitudinally.

*Cordate.* Heart-shaped with the point upward.

*Coriaceous.* Leathery in texture.

*Corm.* The enlarged fleshy base of a stem, bulb-like but solid.

*Corolla.* The inner perianth, of distinct or connate petals.

*Coroniform.* Shaped like a crown.

*Corrugate.* Wrinkled or in folds.

*Corymb.* A flat-topped or convex open flower-cluster, in the stricter use of the word equivalent to a contracted raceme and progressing in its flowering from the margin inward.

*Corymbose.* In corymbs, or corymb-like.

*Cosmopolite.* Found in most parts of the globe (of plants).

*Costa.* A rib; a midrib or mid-nerve.

*Costate.* Ribbed; having one or more longitudinal ribs or nerves.

*Cotyledons.* The foliar portion or first leaves (one, two, or more) of the embryo as found in the seed.

*Crateriform.* In the shape of a saucer or cup, hemispherical or more shallow.

*Creeping.* Running along or under the ground and rooting.

*Crenate.* Dentate with the teeth much rounded.

*Crenulate.* Finely crenate.

*Crested, Cristate.* Bearing an elevated appendage resembling a crest.

*Crown.* An inner appendage to a petal, or to the throat of a corolla.

*Cruciate.* Cross-shaped.

*Crustaceous.* Of hard and brittle texture.

*Cucullate.* Hooded or hood-shaped; cowled.

*Culm.* The peculiar stem of sedges and grasses.

*Cuneate.* Wedge-shaped; triangular with the acute angle downward.

*Cuspidate.* Tipped with a *cusp*, or sharp and rigid point.

*Cylindraceous.* Somewhat or nearly cylindrical.

*Cyme.* A usually broad and flattish determinate inflorescence, i. e. with its central or terminal flowers blooming earliest.

*Cymose.* Bearing cymes or cyme-like.

*Deciduous.* Not persistent; not evergreen.

*Decompound.* More than once compound or divided.

*Decumbent.* Reclining, but with the summit ascending.

*Decurrent* (leaf). Extending down the stem below the insertion.

*Decurved.* Curved downward.

*Decussate.* Alternating in pairs at right angles, or in threes.

*Definite.* Of a constant number, not exceeding twenty.

*Deflexed.* Bent or turned abruptly downward.

*Dehiscent.* Opening regularly by valves, slits, etc., as a capsule or anther.

*Deltoid.* Shaped like the Greek letter Δ.

*Dentate.* Toothed, usually with the teeth directed outward.

*Denticulate.* Minutely dentate.

*Depressed.* Somewhat flattened from above.

*Di-, Dis-.* A Greek prefix signifying two or twice.

*Diadelphous* (stamens). Combined in two sets.

*Diandrous.* Having two stamens.

*Dicarpellary.* Composed of two carpels.

*Dichotomous.* Forking regularly by pairs.

*Dicotyledonous.* Having two cotyledons.

*Didymous.* Twin; found in pairs.

*Didynamous* (stamens). In two pairs of unequal length.

*Diffuse.* Widely or loosely spreading.

*Digitate.* Compound, with the members borne in a whorl at the apex of the support.

*Dimerous* (flower). Having all the parts in twos.

*Dimidiate.* In halves, as if one half were wanting.

*Dimorphous.* Occurring in two forms.

*Diœcious.* Unisexual, with the two kinds of flowers on separate plants.

*Discoid.* Resembling a disk. *Discoid head*, in Compositæ, one without ray-flowers.

*Disk.* A development of the receptacle at or around the base of the pistil. In Compositæ, the tubular flowers of the head as distinct from the ray.

*Dissected.* Cut or divided into numerous segments.

*Dissepiment.* A partition in an ovary or fruit.

*Distichous.* In two vertical ranks.

*Distinct.* Separate; not united; evident.

*Divaricate.* Widely divergent.

*Divergent.* Inclined away from each other.

*Divided.* Lobed to the base.

*Dorsal.* Upon or relating to the back or outer surface of an organ.

*Drupaceous.* Resembling or of the nature of a drupe.

*Drupe.* A fleshy or pulpy fruit with the inner portion of the pericarp (1-celled and 1-seeded, or sometimes several-celled) hard or stony.

*Drupelet.* A diminutive drupe.

*E-* or *Ex-*. A Latin prefix having often a privative signification, as *ebracteate*, without bracts.

*Echinate.* Beset with prickles.

*Effuse.* Very loosely spreading.

*Elater.* A usually spirally marked thread found in the capsules of most Hepaticæ.

*Ellipsoidal.* Nearly elliptical; of solids, elliptical in outline.

*Elliptical.* In the form of an ellipse; oval.

*Emarginate.* Having a shallow notch at the extremity.

*Embryo.* The rudimentary plantlet within the seed.

*Endocarp.* The inner layer of a pericarp.

*Endogenous.* Growing throughout the substance of the stem, instead of by superficial layers.

*Entire.* Without toothing or division.

*Ephemeral.* Lasting only for one day.

*Epidermis.* The cuticle or thin membrane covering the outer surface.

*Epigynous.* Growing on the summit of the ovary, or apparently so.

*Epiphyte.* A plant growing attached to another plant, but not parasitic; an air-plant.

*Eporose.* Without pores.

*Equitant.* Astride, used of conduplicate leaves which enfold each other in two ranks, as in Iris.

*Erect.* Vertical; upright as respects the plane of the base.

*Erose.* As if gnawed.

*Exalbuminous.* Without albumen.

*Excurrent.* Running out, as a nerve of a leaf projecting beyond the margin.

*Exfoliating.* Cleaving off in thin layers.

*Exogenous.* Growing by annular layers near the surface; belonging to the Exogens.

*Exserted.* Projecting beyond an envelope, as stamens from a corolla

*Extrorse.* Facing outward.

*Falcate.* Scythe-shaped; curved and flat, tapering gradually.

*Farinaceous.* Containing starch; starch-like.

*Farinose.* Covered with a meal-like powder.

*Fascicle.* A close bundle or cluster.

*Fastigiate* (branches). Erect and near together.

*Ferruginous.* Rust-color.

*Fertile.* Capable of producing fruit, or productive, as a flower having a pistil, or an anther with pollen.

*Fibrillose.* Furnished or abounding with fine fibres.

*Fibrous.* Composed of or resembling fibres. *Fibrous tissue*, a tissue formed of elongated thick-walled cells.

*Fibro-vascular.* Composed of woody fibres and ducts.

*Filament.* The part of a stamen which supports the anther; any thread-like body.

*Filamentous.* Composed of threads.

*Filiferous.* Thread-bearing.

*Filiform.* Thread-shaped; long, slender, and terete.

*Fimbriate.* Fringed.

*Fimbrillate.* Having a minute fringe.

*Fingered.* Digitate.

*Fistular.* Hollow and cylindrical.

*Flaccid.* Without rigidity; lax and weak.

*Fleshy.* Succulent; juicy; of the consistence of flesh.

*Flexuous.* Zigzag; bending alternately in opposite directions.

*Floccose.* Clothed with locks of soft hair or wool.

*Foliaceous.* Leaf-like in texture or appearance.

*-foliate.* Having leaves.

*-foliolate.* Having leaflets.

*Follicle.* A fruit consisting of a single carpel, dehiscing by the ventral suture.

*Follicular.* Like a follicle.

*Forked.* Divided into nearly equal branches.

*Fornicate.* Arched over, as the corona of some Borraginaceæ, closing the throat.

*Free.* Not adnate to other organs.

*Friable.* Easily crumbled.

*Frond.* The leaf of Ferns and some other Cryptogams; also in some Phænogams, as in Lemnaceæ, where it serves for stem as well as foliage.

*Fruit.* The seed-bearing product of a plant, simple, compound, or aggregated, of whatever form.

*Fugacious.* Falling or fading very early.

*Funicle.* The free stalk of an ovule or seed.

*Fuscous.* Grayish-brown.

*Fusiform.* Spindle-shaped; swollen in the middle and narrowing toward each end.

*Galea.* A hooded or helmet-shaped portion of a perianth, as the upper sepal of Aconitum, and the upper lip of some bilabiate corollas.

*Galeate.* Helmet-shaped; having a galea.

*Gamŏpetalous.* Having the petals of the corolla more or less united.

*Gamophyllous.* Composed of coalescent leaves, sepals, or petals.

*Gemma.* A bud or body analogous to a bud by which a plant propagates itself.

*Gemmiparous.* Producing gemmæ.

*Geniculate.* Bent abruptly, like a knee.

*Gibbous.* Protuberant or swollen on one side.

*Glabrate.* Somewhat glabrous, or becoming glabrous.

*Glabrous.* Smooth; not rough, pubescent, or hairy.

*Gland.* A secreting surface or structure; any protuberance or appendage having the appearance of such an organ.

*Glandular.* Bearing glands or of the nature of a gland.

*Glaucous.* Covered or whitened with a bloom.

*Globose*, *Globular.* Spherical or nearly so.

*Glochidiate.* Barbed at the tip.

*Glomerate.* Compactly clustered.

*Glumaceous.* Furnished with or resembling glumes.

*Glume.* One of the chaffy bracts of the inflorescence of Grasses.

*Granular.* Composed of small grains.

*Gregarious.* Growing in groups or clusters.

*Gymnospermous.* Bearing naked seeds, without an ovary.

*Gynandrous.* Having the stamens borne upon the pistil, as in Orchidaceæ.

*Gynobase.* An enlargement or prolongation of the receptacle bearing the ovary.

*Habit.* The general appearance of a plant.

*Halberd-shaped.* The same as Hastate.

*Hastate.* Like an arrow-head, but with the basal lobes pointing outward nearly at right angles.

*Head.* A dense cluster of sessile or nearly sessile flowers on a very short axis or receptacle.

*Heart-shaped.* Ovate with a sinus at base.

*Herb.* A plant with no persistent woody stem above ground.

*Herbaceous.* Having the characters of an herb; leaf-like in color and texture.

*Heterocarpous.* Producing more than one kind of fruit.

*Heterogamous.* Bearing two kinds of flowers.

*Hilum.* The scar or point of attachment of the seed.

*Hirsute.* Pubescent with rather coarse or stiff hairs.

*Hispid.* Beset with rigid or bristly hairs or with bristles.

*Hispidulous.* Minutely hispid.

*Hoary.* Grayish-white with a fine close pubescence.

*Homogamous.* Bearing but one kind of flowers.

*Hooded.* Shaped like a hood or cowl.

*Hyaline.* Transparent or translucent.

*Hybrid.* A cross-breed of two species.

*Hypogynous.* Situated on the receptacle beneath the ovary and free from it and from the calyx; having the petals and stamens so situated.

*Imbricate.* Overlapping, either vertically or spirally, where the lower piece covers the base of the next higher, or laterally, as in the æstivation of a calyx or corolla, where at least one piece must be wholly external and one internal.

*Immersed.* Growing wholly under water; wholly covered by the involucral leaves, as sometimes the capsule in Hepaticæ.

*Incised.* Cut sharply and irregularly, more or less deeply.

*Included.* Not at all protruded from the surrounding envelope.

*Incubous* (leaf). Having the tip or upper margin overlapping the lower margin of the leaf above.

*Incumbent* (cotyledons). Lying with the back of one against the radicle.

*Indefinite* (stamens). Inconstant in number or very numerous.

*Indehiscent.* Not opening by valves, etc.; remaining persistently closed.

*Indigenous.* Native and original to the country.

*Indurated.* Hardened.

*Indusium.* The proper (often shield-shaped) covering of the sorus or fruit-dot in Ferns.

*Inequilateral.* Unequal-sided.

*Inferior.* Lower or below; outer or anterior. *Inferior ovary*, one that is adnate to the calyx.

*Inflated.* Bladdery.

*Inflorescence.* The flowering part of a plant, and especially the mode of its arrangement.

*Infra-.* In composition, below; as *infra-axillary*, below the axil.

*Innovation.* An offshoot from the stem.

*Inserted.* Attached to or growing out of.

*Inter-* or *intra-*. In composition, between.

*Interfoliaceous.* Between the leaves of a pair, as the stipules of many Rubiaceæ.

*Internode.* The portion of a stem between two nodes.

*Intramarginal.* Within and near the margin.

*Introrse.* Turned inward or toward the axis.

*Involucel.* A secondary involucre, as that of an umbellet in Umbelliferæ.

*Involucellate.* Having an involucel.

*Involucral.* Belonging to an involucre.

*Involucrate.* Having an involucre.

*Involucre.* A circle or collection of bracts surrounding a flower cluster or head, or a single flower.

*Involute.* Rolled inward.

*Irregular* (flower). Showing inequality in the size, form, or union of its similar parts.

*Julaceous.* Resembling a catkin in appearance.

*Keel.* A central dorsal ridge, like the keel of a boat; the two anterior united petals of a papilionaceous flower.

*Kidney-shaped.* Crescentic with the ends broad and rounded; reniform.

*Labiate.* Lipped; belonging to the Labiatæ.

*Lacerate.* Irregularly cleft as if torn.

*Laciniate.* Slashed; cut into narrow pointed lobes.

*Lamella.* A thin flat plate or laterally flattened ridge.

*Lanceolate.* Shaped like a lance-head, broadest above the base and narrowed to the apex.

*Lateral.* Belonging to or borne on the side.

*Lax.* Loose and slender.

*Leaflet.* A single division of a compound leaf.

*Legume.* The fruit of the Leguminosæ, formed of a simple pistil and usually dehiscent by both sutures.

*Leguminous.* Pertaining to a legume or to the Leguminosæ.

*Lenticular.* Lentil-shaped; of the shape of a double-convex lens.

*Lepidote.* Beset with small scurfy scales.

*Ligulate.* Furnished with a ligule.

*Ligule.* A strap-shaped corolla, as in the ray-flowers of Compositæ; a thin scarious projection from the summit of the sheath in Grasses.

*Liliaceous.* Lily-like; belonging to the Liliaceæ.

*Limb.* The expanded portion of a gamopetalous corolla, above the throat; the expanded portion of any petal, or of a leaf.

*Linear.* Long and narrow, with parallel margins.

*Lip.* Each of the upper and lower divisions of a bilabiate corolla or calyx; the peculiar upper petal in Orchids.

*Lobe.* Any segment of an organ, especially if rounded.

*Lobed.* Divided into or bearing lobes.

*-locular.* In composition, having cells.

*Loculicidal.* Dehiscent into the cavity of a cell through the dorsal suture

*Lunate.* Of the shape of a half-moon or crescent.

*Lunulate.* Diminutive of Lunate.

*Lyrate.* Pinnatifid with a large and rounded terminal lobe, and the lower lobes small.

*Macrospore.* The larger kind of spore in Selaginellaceæ, etc.

*Marcescent.* Withering but persistent.

*Marginal.* Along or near the edge.

*Marginate.* Furnished with a border peculiar in texture or appearance.

*Mealy.* Farinaceous.

*Membranaceous, Membranous.* Thin and rather soft and more or less translucent.

*Meniscoid.* Concavo-convex.

*Mericarp.* One of the achene-like carpels of Umbelliferæ.

*-merous.* In composition, having parts, as 2-merous, having two parts of each kind.

*Micropyle.* The point upon the seed at which was the orifice of the ovule.

*Microspore.* The smaller kind of spore in Selaginellaceæ, etc.

*Midrib.* The central or main rib of a leaf.

*Mitriform.* Shaped like a mitre or cap.

*Monadelphous* (stamens). United by their filaments into a tube or column.

*Moniliform.* Resembling a string of beads; cylindrical with contractions at intervals.

*Monocotyledonous.* Having but one cotyledon.

*Monœcious.* With stamens and pistils in separate flowers on the same plant.

*Mucilaginous.* Slimy; containing mucilage.

*Mucro.* A short and small abrupt tip.

*Mucronate.* Tipped with a mucro.

*Multifid.* Cleft into many lobes or segments.

*Muricate.* Rough with short hard points.

*Muriculate.* Very finely muricate.

*Naked.* Bare; without the usual covering or appendages.

*Nectary.* Any place or organ where nectar is secreted.

*Nectariferous.* Producing nectar.

*Nerve.* A simple or unbranched vein or slender rib.

*Node.* The place upon a stem which normally bears a leaf or whorl of leaves.

*Nodose.* Knotty or knobby.

*Nucleus.* The germ-cell of the ovule, which by fertilization becomes the seed; the kernel of a seed.

*Numerous.* Indefinite in number.

*Nut.* A hard indehiscent 1-celled and 1-seeded fruit, though usually resulting from a compound ovary.

*Nutlet.* A diminutive nut.

*Ob-.* A Latin prefix, usually carrying the idea of inversion.

*Obcompressed.* Compressed dorso ventrally instead of laterally

*Obconically.* Inversely conical, having the attachment at the apex.

*Obcordate.* Inverted heart-shaped.

*Oblanceolate.* Lanceolate with the broadest part toward the apex.

*Oblique.* Unequal-sided or slanting.

*Oblong.* Considerably longer than broad and with nearly parallel sides.

*Obovate.* Inverted ovate.

*Obovoid.* Having the form of an inverted egg.

*Obsolete.* Not evident; rudimentary.

*Obtuse.* Blunt or rounded at the end.

*Ocrea.* A leggin-shaped or tubular stipule.

*Ocreate.* Having sheathing stipules.

*Ochroleucous.* Yellowish-white.

*Officinal.* Of the shops; used in medicine or the arts.

*Oöspore.* The fertilized nucleus or germ-cell of the archegonium in Cryptogams, from which the new plant is directly developed.

*Opaque.* Dull; not smooth and shining.

*Operculate.* Furnished with a lid.

*Operculum.* A lid; the upper portion of a circumscissile capsule.

*Orbicular.* Circular.

*Orthotropous* (ovule or seed). Erect, with the orifice or micropyle at the apex.

*Oval.* Broadly elliptical.

*Ovary.* The part of the pistil that contains the ovules.

*Ovate.* Egg-shaped; having an outline like that of an egg, with the broader end downward.

*Ovoid.* A solid with an oval outline.

*Ovule.* The body which after fertilization becomes the seed.

*Ovuliferous.* Bearing ovules.

*Palate.* A rounded projection of the lower lip of a personate corolla, closing the throat.

*Paleaceous.* Chaffy.

*Palet.* The upper thin chaffy or hyaline bract which with the glume encloses the flower in Grasses.

*Palmate* (leaf). Radiately lobed or divided.

*Palmately.* In a palmate manner.

*Panicle.* A loose irregularly compound inflorescence with pedicellate flowers.

*Panicled, Paniculate.* Borne in a panicle; resembling a panicle.

*Papilionaceous* (corolla). Having a standard, wings, and keel, as in the peculiar corolla of many Leguminosæ.

*Papillose.* Bearing minute nipple-shaped projections.

*Pappus.* The modified calyx-limb in Compositæ, forming a crown of very various character at the summit of the achene.

*Parasitic.* Growing on and deriving nourishment from another plant.

*Parietal.* Borne on or pertaining to the wall or inner surface of a capsule.

*Parted.* Cleft nearly but not quite to the base.

*Partial.* Of secondary rank.

*Pectinate.* Pinnatifid with narrow closely set segments; comb-like.

*Pedate.* Palmately divided or parted, with the lateral segments 2-cleft.

*Pedicel.* The support of a single flower.

*Pedicellate.* Borne on a pedicel.

*Peduncle.* A primary flower-stalk, supporting either a cluster or a solitary flower.

*Pedunculate.* Borne upon a peduncle.

*Peltate.* Shield-formed and attached to the support by the lower surface.

*Pendulous.* More or less hanging or declined. *Pendulous ovule*, one that hangs from the side of the cell.

*Perennial.* Lasting year after year.

*Perfect* (flower). Having both pistil and stamens.

*Perfoliate* (leaf). Having the stem apparently passing through it.

*Perianth.* The floral envelope, consisting of the calyx and corolla (when present), whatever their form; in Hepaticæ, the inner usually sac-like involucre of the archegonium.

*Pericarp.* The matured ovary.

*Perigynium.* The inflated sac which encloses the ovary in Carex.

*Perigynous.* Adnate to the perianth, and therefore around the ovary and not at its base.

*Persistent.* Long-continuous, as a calyx upon the fruit, leaves through winter, etc.

*Personate* (corolla). Bilabiate, and the throat closed by a prominent palate.

*Petal.* A division of the corolla.

*Petaloid.* Colored and resembling a petal.

*Petiolate.* Having a petiole.

*Petiole.* The footstalk of a leaf.

*Phænogamous.* Having flowers with stamens and pistils and producing seeds.

*Phyllodium.* A somewhat dilated petiole having the form of and serving as a leaf-blade.

*Pilose.* Hairy, especially with soft hairs.

*Pinna* (pl. *Pinnæ*). One of the primary divisions of a pinnate or compoundly pinnate frond or leaf.

*Pinnate* (leaf). Compound, with the leaflets arranged on each side of a common petiole.

*Pinnatifid.* Pinnately cleft.

*Pinnule.* A secondary pinna; one of the pinnately disposed divisions of a pinna.

*Pistil.* The seed-bearing organ of the flower, consisting of the ovary, stigma, and style when present.

*Pistillate.* Provided with pistils, and, in its more proper sense, without stamens.

*Pitted.* Marked with small depressions or pits.

*Placenta.* Any part of the interior of the ovary which bears ovules.

*Plane.* Flat; with a flat surface or surfaces.

*Plicate.* Folded into plaits, usually lengthwise.

*Plumose.* Having fine hairs on each side, like the plume of a feather, as the pappus-bristles of Thistles.

*Plumule.* The bud or growing point of the embryo.

*Pod.* Any dry and dehiscent fruit.

*Pointed.* Acuminate.

*Pollen.* The fecundating grains contained in the anther.

*Polliniferous.* Bearing pollen.

*Pollinium* (pl. *Pollinia*). A mass of waxy pollen or of coherent pollen-grains, as in Asclepias and Orchids.

*Polypetalous.* Having separate petals.

*Pome.* A kind of fleshy fruit of which the apple is the type.

*Porose.* Pierced with small holes or pores.

*Posterior.* In an axillary flower, on the side nearest to the axis of inflorescence.

*Posticous.* On the posterior side; extrorse.

*Præmorse.* Appearing as if bitten off.

*Prickle.* A small spine or more or less slender sharp outgrowth from the bark or rind.

*Prismatic.* Of the shape of a prism, angular, with flat sides, and of nearly uniform size throughout.

*Procumbent.* Lying on the ground.

*Proliferous.* Producing offshoots.

*Prostrate.* Lying flat upon the ground.

*Proterogynous.* Having the stigma ripe for the pollen before the maturity of the anthers of the same flower.

*Prothallus.* A cellular usually flat and thallus-like growth, resulting from the germination of a spore, upon which are developed sexual organs or new plants.

*Pseudaxillary.* Terminal but becoming apparently axillary by the growth of a lateral branch.

*Pseudo-costate.* False-ribbed, as where a marginal vein or rib is formed by the confluence of the true veins.

*Pteridophytes.* Fern-plants; Ferns and their allies.

*Puberulent.* Minutely pubescent.

*Pubescent.* Covered with hairs, especially if short, soft and downy.

*Punctate.* Dotted with depressions or with translucent internal glands or colored dots.

*Puncticulate.* Minutely punctate.

*Pungent.* Terminating in a rigid sharp point; acrid.

*Putamen.* The shell of a nut; the bony part of a stone-fruit.

*Quadrate.* Nearly square in form.

*Raceme.* A simple inflorescence of pedicelled flowers upon a common more or less elongated axis.

*Racemose.* In racemes; or resembling a raceme.

*Radiate.* Spreading from or arranged around a common centre; bearing ray-flowers.

*Radical.* Belonging to or proceeding from the root or base of the stem near the ground.

*Radicle.* The portion of the embryo below the cotyledons, more properly called the caudicle.

*Radiculose.* Bearing rootlets.

*Rameal.* Belonging to a branch.

*Ramification.* Branching.

*Ray.* The branch of an umbel; the marginal flowers of an inflorescence when distinct from the disk.

*Receptacle.* The more or less expanded or produced portion of an axis which bears the organs of a flower (the *torus*) or the collected flowers of a head; any similar structure in Cryptogams.

*Recurved.* Curved downward or backward.

*Reflexed.* Abruptly bent or turned downward.

*Regular.* Uniform in shape or structure.

*Reniform.* Kidney-shaped.

*Repand.* With a slightly uneven and somewhat sinuate margin.

*Resiniferous.* Producing resin.

*Reticulate.* In the form of network; net-veined.

*Retrorse.* Directed back or downward.

*Retuse.* With a shallow notch at a rounded apex.

*Revolute.* Rolled backward from the margins or apex.

*Rhachis.* The axis of a spike or of a compound leaf.

*Rhaphe.* The ridge or adnate funicle which in an anatropous ovule connects the two ends.

*Rhizome.* Any prostrate or subterranean stem, usually rooting at the nodes and becoming erect at the apex. Very variable in character, and including morphologically the tuber, corm, bulb, etc.

*Rhombic*, *Rhomboidal.* Somewhat lozenge-shaped; obliquely four sided.

*Rib.* A primary or prominent vein of a leaf.

*Ringent.* Gaping, as the mouth of an open bilabiate corolla.

*Root.* The underground part of a plant which supplies it with nourishment.

*Rootstock.* Same as Rhizome.

*Rostrate.* Having a beak or spur.

*Rosulate.* In the form of a rosette.

*Rotate* (corolla). Wheel-shaped; flat and circular in outline.

*Rotund.* Rounded in outline.

*Rudiment.* A very partially developed organ; a vestige.

*Rudimentary.* But slightly developed.

*Rufous.* Reddish brown.

*Rugose.* Wrinkled.

*Runcinate.* Sharply incised, with the segments directed backward.

*Runner.* A filiform or very slender stolon.

*Saccate.* Sac-shaped.

*Sagittate.* Shaped like an arrow-head, the basal lobes directed downward.

*Salver-shaped* (corolla). Having a slender tube abruptly expanded into a flat limb.

*Samara.* An indehiscent winged fruit.

*Scabrous.* Rough to the touch.

*Scalariform* (vessels). Having transverse markings like the rounds of a ladder.

*Scape.* A peduncle rising from the ground, naked or without proper foliage.

*Scapose.* Bearing or resembling a scape.

*Scarious.* Thin, dry, and membranaceous, not green.

*Scorpioid* (inflorescence). Circinately coiled while in bud.

*Scurf.* Small bran-like scales on the epidermis.

*Scymitar-shaped* (leaf). Curved with a flat-triangular section, the straighter edge the thickest.

*Seed.* The ripened ovule, consisting of the embryo and its proper coats.

*Segment.* One of the parts of a leaf or other like organ that is cleft or divided.

*Sepal.* A division of a calyx.

*Septicidal* (capsule). Dehiscing through the partitions and between the cells.

*Septum.* Any kind of partition.

*Serrate.* Having teeth pointing forward.

*Serrulate.* Finely serrate.

*Sessile.* Without footstalk of any kind.

*Setaceous.* Bristle like.

*Setose.* Beset with bristles.

*Setulose.* Having minute bristles.

*Sheath.* A tubular envelope, as the lower part of the leaf in Grasses.

*Sheathing.* Enclosing as by a sheath.

*Shrub.* A woody perennial, smaller than a tree.

*Silicle.* A short silique.

*Silique.* The peculiar pod of Cruciferæ.

*Silky.* Covered with close-pressed soft and straight pubescence.

*Simple.* Of one piece ; not compound.

*Sinuate.* With the outline of the margin strongly wavy.

*Sinus.* The cleft or recess between two lobes.

*Smooth.* Without roughness or pubescence.

*Sorus* (pl. *Sori*). A heap or cluster, applied to the fruit-dots of Ferns.

*Spadix.* A spike with a fleshy axis.

*Spathe.* A large bract or pair of bracts enclosing an inflorescence.

*Spatulate.* Gradually narrowed downward from a rounded summit.

*Spicate.* Arranged in or resembling a spike.

*Spiciform.* Spike-like.

*Spike.* A form of simple inflorescence with the flowers sessile or nearly so upon a more or less elongated common axis.

*Spikelet.* A small or secondary spike.

*Spindle-shaped.* Same as Fusiform.

*Spine.* A sharp woody or rigid outgrowth from the stem.

*Spinose.* Spine-like, or having spines.

*Sporangium.* A spore-case.

*Spore.* The reproductive organ in Cryptogams which corresponds to a seed.

*Sporocarp.* The fruit-cases of certain Cryptogams containing sporangia or spores.

*Spur.* A hollow sac-like or tubular extension of some part of a blossom, usually nectariferous.

*Squamula.* A reduced scale, as the hypogynous scales in Grasses.

*Squarrose.* Having spreading and projecting processes, such as the tips of involucral scales.

*Squarrulose.* Diminutively squarrose.

*Stamen.* One of the pollen-bearing or fertilizing organs of the flower.

*Staminodium.* A sterile stamen, or any structure without anther corresponding to a stamen.

*Standard.* The upper dilated petal of a papilionaceous corolla.

*Stellate, Stelliform.* Star-shaped.

*Stem.* The main ascending axis of a plant.

*Sterile.* Unproductive, as a flower without pistil, or stamen without an anther.

*Stigma.* That part of a pistil through which fertilization by the pollen is effected.

*Stigmatic.* Belonging to or characteristic of the stigma.

*Stipe.* The stalk-like support of a pistil ; the leaf-stalk of a Fern.

*Stipitate.* Having a stipe.

*Stipular.* Belonging to stipules.

*Stipulate.* Having stipules.

*Stipule.* An appendage at the base of a petiole or on each side of its insertion.

*Stolon.* A runner, or any basal branch that is disposed to root.

*Stoloniferous.* Producing stolons.

*Stoma* (pl. *Stomata*). An orifice in the epidermis of a leaf communicating with internal air-cavities.

*Striate.* Marked with fine longitudinal lines or ridges.

*Strict.* Very straight and upright.

*Strigose.* Beset with appressed sharp straight and stiff hairs.

*Strobile.* An inflorescence marked by imbricated bracts or scales, as in the Hop and Pine-cone.

*Strophiole.* An appendage at the hilum of certain seeds.

*Style.* The usually attenuated portion of the pistil connecting the stigma and ovary.

*Stylopodium.* A disk-like expansion at the base of a style, as in Umbelliferæ.

*Sub-.* A Latin prefix, usually signifying somewhat or slightly.

*Subulate.* Awl-shaped.

*Succubous* (leaves). Having the upper margin of a leaf covered by the base of the one above.

*Succulent.* Juicy; fleshy.

*Suffrutescent.* Slightly or obscurely shrubby.

*Suffruticose.* Very low and woody; diminutively shrubby.

*Sulcate.* Grooved or furrowed.

*Superior* (ovary). Free from the calyx.

*Suspended* (ovule). Hanging from the apex of the cell.

*Suture.* A line of dehiscence.

*Symmetrical* (flower). Regular as to the number of its parts; having the same number of parts in each circle.

*Synonym.* A superseded or unused name.

*Tail.* Any slender terminal prolongation.

*Terete.* Having a circular transverse section.

*Terminal.* At or belonging to the apex.

*Ternary.* Consisting of three.

*Ternate.* In threes.

*Tetradynamous.* Having four long and two shorter stamens.

*Tetragonal.* Four-angled.

*Thalamiflorous.* Having the parts of the flower hypogynous.

*Thalloid, Thallose.* Resembling a thallus.

*Thallus.* In Cryptogams, a cellular expansion taking the place of stem and foliage.

*Throat.* The orifice of a gamopetalous corolla or calyx; the part between the proper tube and the limb.

*Thyrse.* A contracted or ovate and usually compact panicle.

*Thyrsoid.* Resembling a thyrse.

*Tomentose.* Densely pubescent with matted wool.

*Tooth.* Any small marginal lobe.

*Torose.* Cylindrical with contractions at intervals.

*Torulose.* Diminutive of Torose.

*Torus.* The receptacle of a flower.

*Transverse.* Across; in a right and left direction.

*Tri-.* In composition, three or thrice.

*Triandrous.* Having three stamens.

*Trifoliolate.* Having three leaflets.

*Trigonous.* Three-angled.

*Trimorphous.* Occurring under three forms.

*Triquetrous.* Having three salient angles, the sides concave or channelled.

*Truncate.* Ending abruptly, as if cut off transversely.

*Tuber.* A thickened and short subterranean branch, having numerous buds or eyes.

*Tubercle.* A small tuber or tuber-like body.

*Tuberiferous.* Bearing tubers.

*Tuberous.* Having the character of a tuber; tuber-like in appearance.

*Tumid.* Swollen

*Tunicated.* Having concentric coats, as an onion

*Turbinate.* Top-shaped; inversely conical.

*Twining.* Winding spirally about a support.

*Umbel.* An inflorescence in which a cluster of peduncles or pedicels spring from the same point.

*Umbellate.* In or like an umbel.

*Umbellet.* A secondary umbel.

*Umbonate.* Bearing a stout projection in the centre; bossed.

*Underleaves.* The small accessory leaves or stipules on the under side of the stem in Hepaticæ.

*Undulate.* With a wavy surface; repand.

*Unguiculate.* Contracted at base into a claw.

*Uni-.* In composition, one.

*Unisexual.* Of one sex, either staminate or pistillate only.

*Urceolate.* Hollow and cylindrical or ovoid, and contracted at or below the mouth, like an urn.

*Utricle.* A small bladdery 1-seeded fruit; any small bladder-like body.

*Valvate.* Opening by valves, as a capsule; in æstivation, meeting by the edges without overlapping.

*Valve.* One of the pieces into which a capsule splits.

*Vascular.* Furnished with vessels or ducts.

*Veins.* Threads of fibro-vascular tissue in a leaf or other organ, especially those which branch (as distinguished from nerves).

*Ventral.* Belonging to the anterior or inner face of an organ; the opposite of dorsal.

*Ventricose.* Swelling unequally, or inflated on one side.

*Vernation.* The arrangement of leaves in the bud.

*Verrucose.* Covered with wart-like elevations.

*Versatile* (anther). Attached near the middle and turning freely on its support.

*Vertical.* Perpendicular to the horizon; longitudinal.

*Verticillate.* Disposed in a whorl.

*Vesicle.* A small bladder or air-cavity.

*Vesicular, Vesiculose.* Composed of or covered with vesicles.

*Villous.* Bearing long and soft hairs.

*Virgate.* Wand-shaped; slender, straight and erect

*Viscid.* Glutinous; sticky.

*Whorl.* An arrangement of leaves, etc., in a circle round the stem.

*Wing.* Any membranous or thin expansion bordering or surrounding an organ; the lateral petal of a papilionaceous corolla.

*Woolly.* Clothed with long and tortuous or matted hairs.

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# PLATES

## WITH EXPLANATIONS.

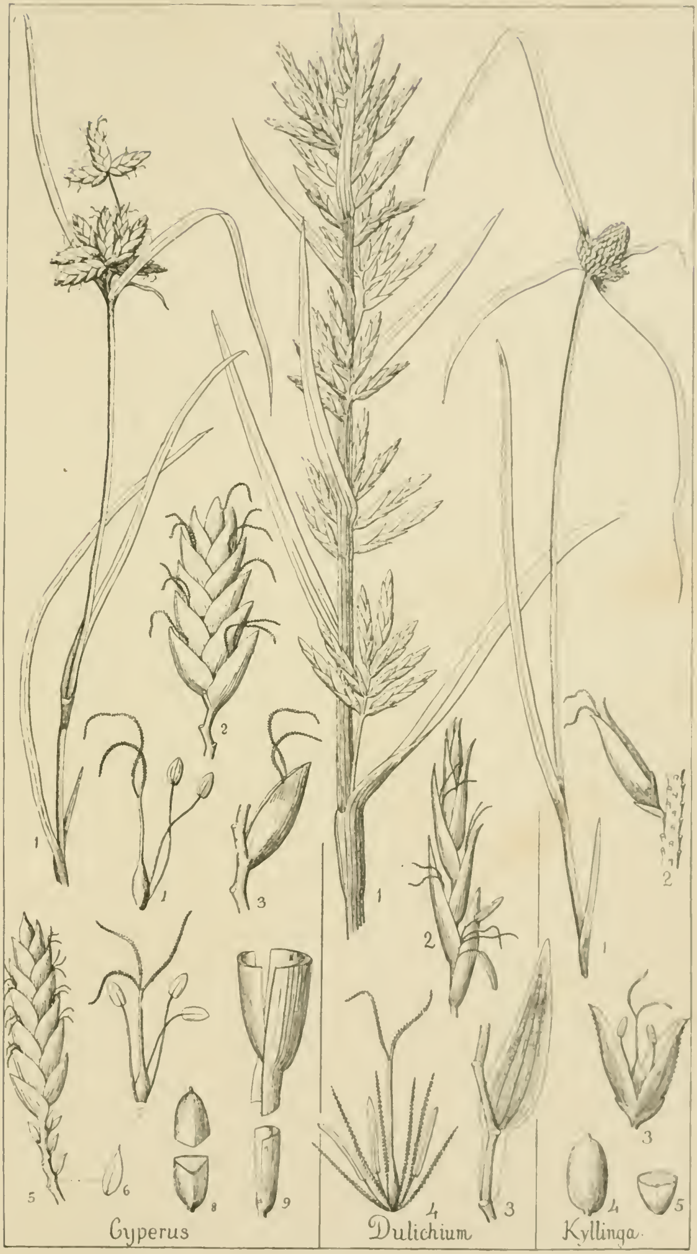
# EXPLANATION OF PLATE I.

CYPERUS. — (1) Small plant of C. diandrus; (2) a spikelet magnified; (3) a piece of the rhachis with one scale enclosing its flower; (4) a separate flower more magnified. — (5) C. erythrorhizos, a spikelet magnified; the lower scales and flowers have fallen, showing the small internal scales of the section Papyrus, formed of the winged margins of the joints of the rhachis detached; (6) a separate one, more enlarged; (7) a flower; (8) an achene, cut in two. — (9) C. dentatus, a piece of the rhachis of a spike with the lower part of one scale, showing how it is decurrent on the joint beneath (cut across) to form scale-like wings.

DULICHIUM. — (1) Upper part of a plant of D. spathaceum; (2) part of a spikelet somewhat enlarged; (3) piece of rhachis, and one scale decurrent on the joint beneath; (4) magnified flower.

KYLLINGA. — (1) Plant of K. pumila; (2) one-flowered spikelet on a piece of the rhachis, enlarged; (3) the same, more enlarged and open; (4) achene; and (5) section of same magnified.

Genera of Cyperaceae Plate 1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Cyperus

Dulichium

Kyllinga.

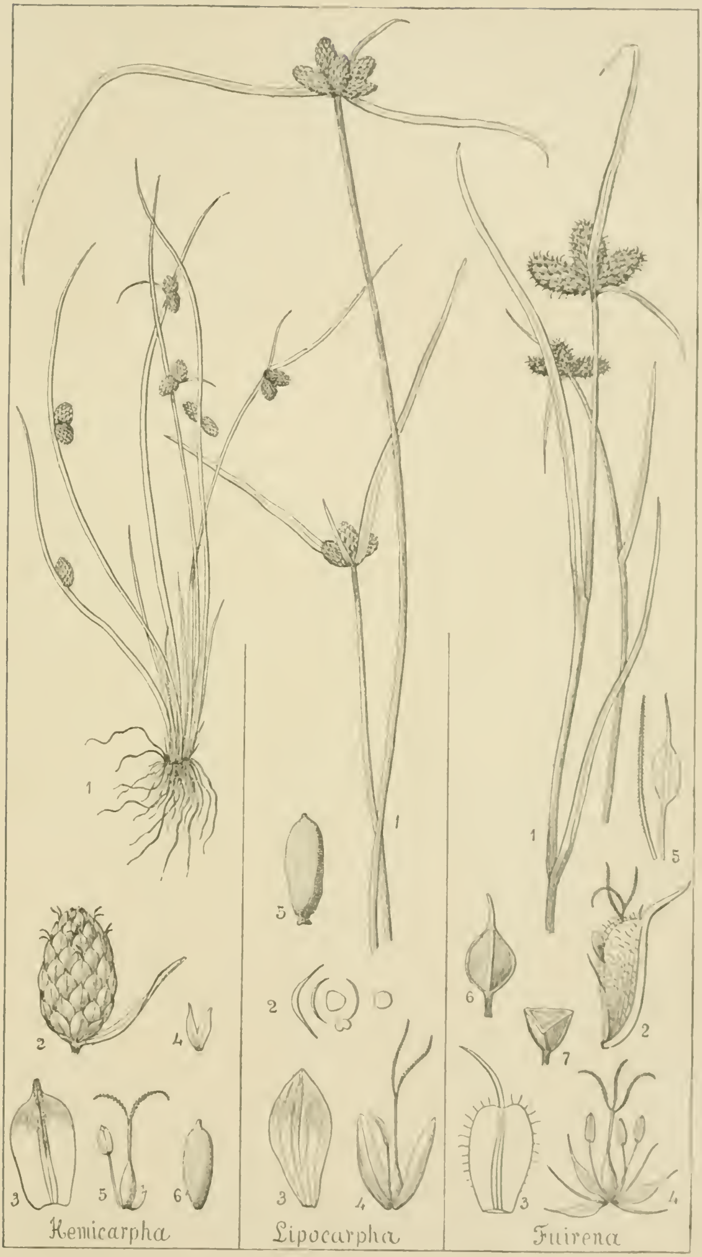
## EXPLANATION OF PLATE II.

HEMICARPHA. — (1) Plant of H. subsquarrosa, natural size; (2) a spikelet enlarged, with its bract; (3) magnified scale of the same; (5) a flower, with its single stamen and minute internal scale, magnified; (6) achene, magnified.

LIPOCARPHA. — (1) Upper part of plants of L. maculata, with spikelets; (2) diagram of a flower, representing the ovary between the two internal scales, a single stamen, the scale of the spikelet on one side, and the axis of the spikelet on the other; (3) scale of spikelet detached; (4) a flower with its two inner scales; (5) achene, magnified.

FUIRENA. — (1) Upper portion of plant of F. squarrosa, var. pumila; (2) scale of spike enclosing a flower; (3) open scale of same; (4) flower; (5) one of the scales and one of the bristles of the perianth; (6) achene, and (7) section of same.

Genera of Cyperaceae Plate II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Hemicarpha Lipocarpha Fuirena

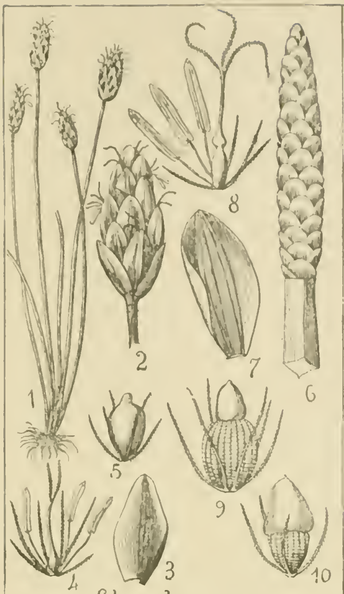
## EXPLANATION OF PLATE III.

ELEOCHARIS. — (1) Small plant of E. olivacea; (2) the spikelet enlarged; (3) detached scale; (4) flower; (5) achene and bristles. — (6) E. quadrangulata, spikelet; (7) a scale; (8) flower; (9) achene and bristles. — (10) E. tuberculosa; the achene with its great tubercle, and bristles.

SCIRPUS. — (1) Summit of plant of small S. debilis; (2) a spikelet; (3) a scale of the same, and (4) flower; (5) achene with its bristles.

ERIOPHORUM. — (1) Small plant of E. alpinum, in flower; (2) spikelet; (3) a scale, and (4) a flower from the same; (5) the spikelet, in fruit, the bristles forming a cottony tuft; (6) achene and its bristles. — (6, under *Scirpus*) a small portion of the inflorescence of E. cyperinum; (7) a flower; (8) a spikelet in fruit; (9) achene from the same, with the tortuous bristles; (10) section of the achene.

FIMBRISTYLIS. — (1) Summit of a small flowering stem of F. laxa; (2) a spikelet of the same; (3) a detached scale, and (4) a flower of the same; (5) achene. — F. autumnalis; (6), a spikelet, enlarged; (7) flower; (8) achene, and (9) section of the same.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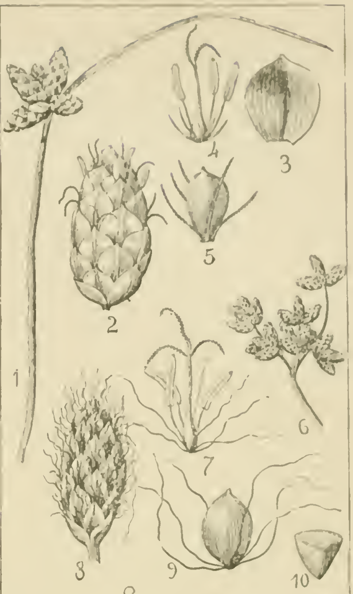
Eleocharis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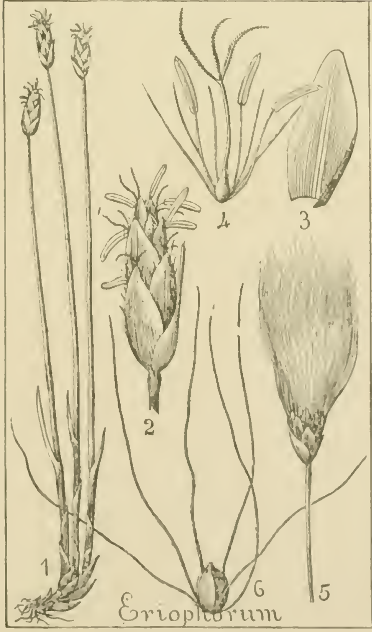
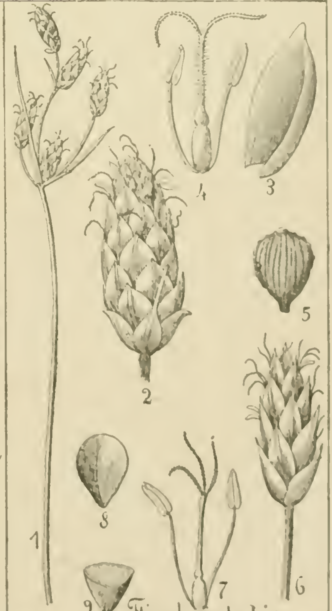
Scirpus



Eriophorum



Fimbristylis

## EXPLANATION OF PLATE IV.

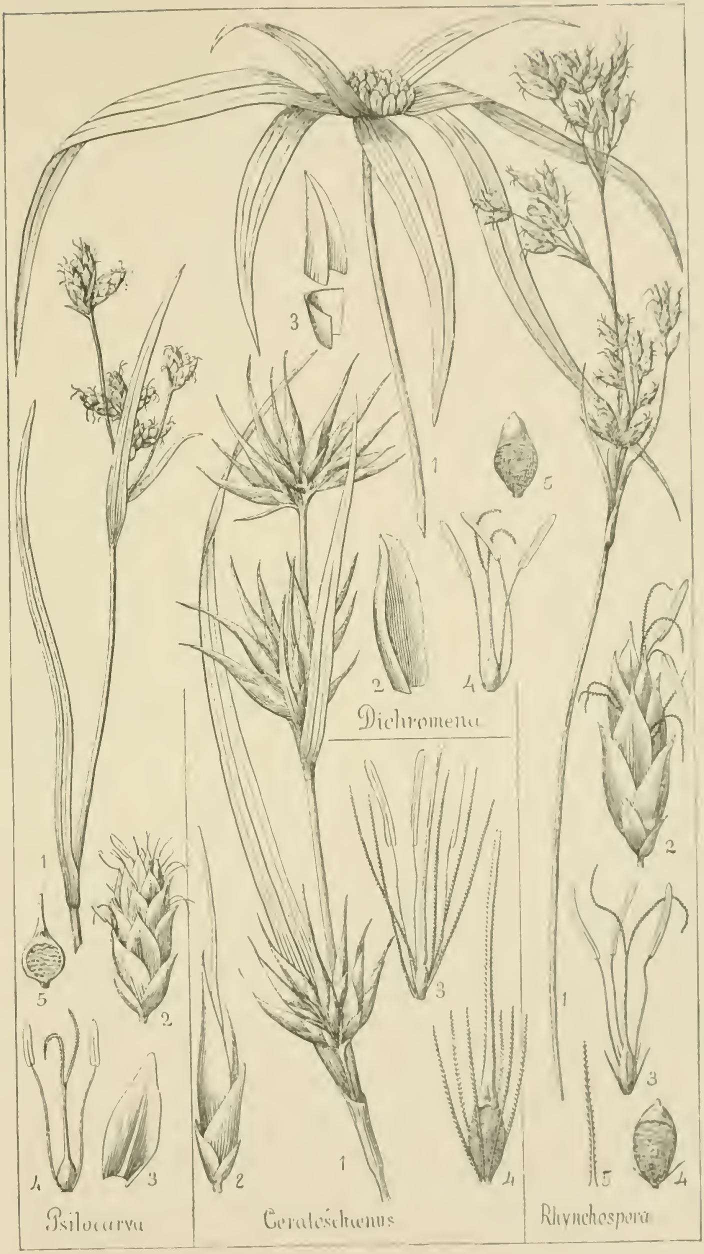
DICHROMENA. — (1) Head and involucre of D. latifolia; (2) a scale from one of the spikelets, and (3) the same cut across; (4) a flower; (5) achene with its tubercle.

PSILOCARYA. — (1) Part of plant, (2) enlarged spikelet, (3) detached scale, (4) flower, and (5) achene with its beak, of P. scirpoides.

RHYNCHOSPORA. — (1) Upper part of flowering stem of R. Torreyana; (2) a spikelet; (3) detached flower; (4) achene, with short bristles at its base; (5) one of these bristles more magnified.

R. (§ CERATOSCHŒNUS). — (1) Upper part of fruiting plant, (2) detached spikelet, (3) flower, and (4) beaked achene, with its bristles, of R. macrostachya.

Genera of Cyperaceæ Plate IV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Dichromena
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Psilocarya
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Ceratoschœnus
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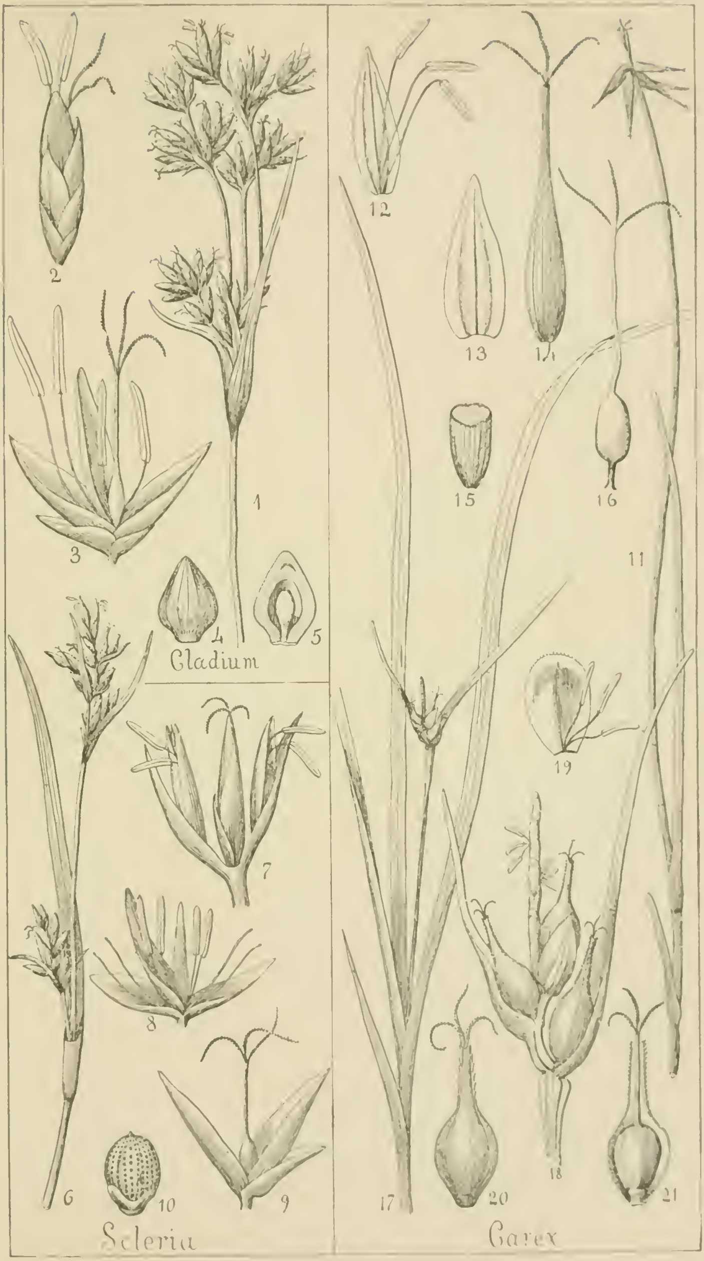
Rhynchospora

## EXPLANATION OF PLATE V.

CLADIUM. — (1) Summit of a plant of C. mariscoides; (2) detached spikelet; (3) same, open, showing a staminate and a perfect flower; (4) the nut-like achene, and (5) the longitudinal section of the same.

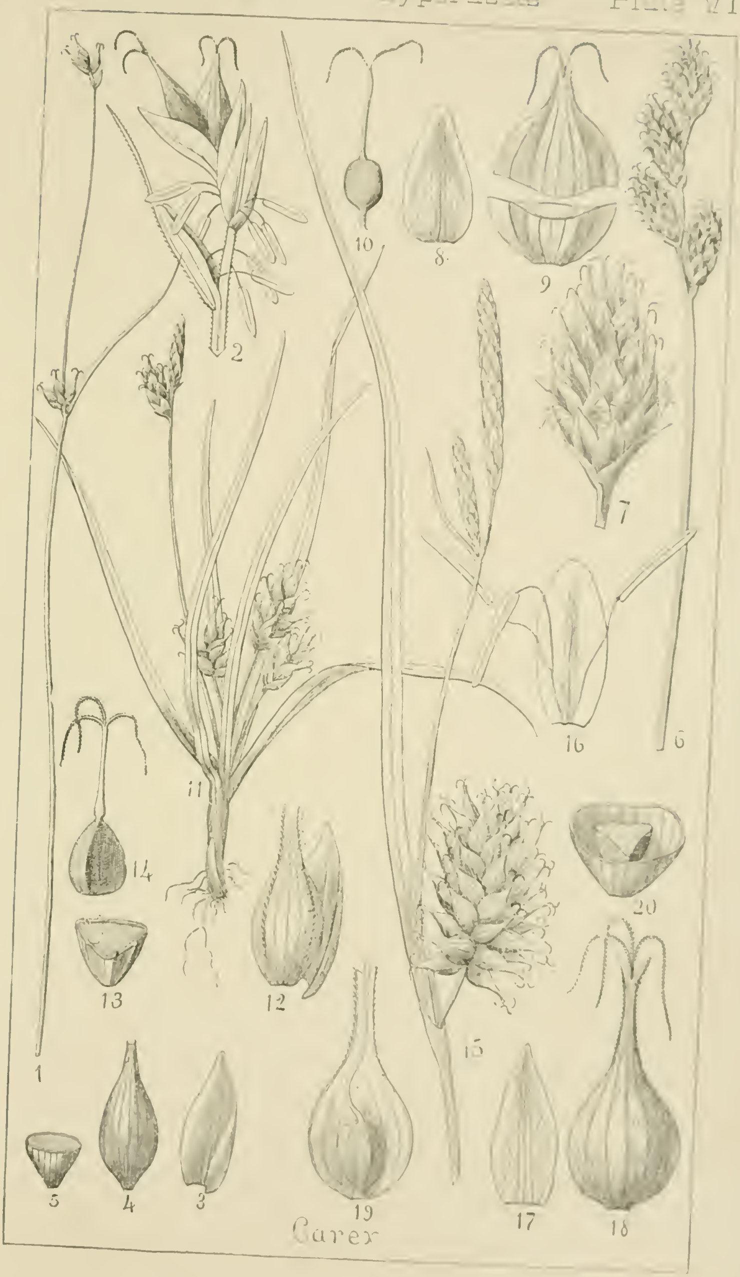
SCLERIA. — (6) Summit of a flowering stem of S. reticularis; (7) three spikelets from a cluster, the middle one pistillate, the lateral ones staminate; (8) staminate spikelet displaying four male flowers, the filaments of two of them having lost their anthers; (9) pistillate spikelet displaying a single pistillate flower; (10) achene with the 3-lobed double cup underneath.

CAREX. — (11) Plant of C. pauciflora; (12) a staminate flower with its scale; (13) scale, and (14) mature pistillate flower, in its perigynium; (15) cross-section of perigynium and of the contained achene; (16) achene on its stalk, style and stigmas. — (17) C. Jamesii, upper part of flowering plant; (18) the spike enlarged; (19) a staminate flower and its scale; (20) pistillate flower in its perigynium; (21) the same with half the perigynium cut away to show the contained achene and style.


Cladium
Scleria
Carex

# EXPLANATION OF PLATE VI.

CAREX. — (1) C. trisperma, upper part of a stem in fruit; (2) enlarged spike displayed, with three staminate and two pistillate flowers; (3) a scale, and (4) a ripe perigynium, of the latter; with (5) a section of the perigynium near the base, and of the contained achene. — (6) C. straminea, var. brevior, summit of a fruiting plant; (7) a spike enlarged; (8) scale of a pistillate flower; (9) the winged perigynium and the contained achene cut across; (10) detached achene with persistent style and stigmas. — (11) C. umbellata, whole plant; (12) a perigynium and its scale; (13) cross-section toward the base of perigynium and its contained achene; (14) detached achene with its persistent style and stigmas. — C. bullata; (15) upper part of plant in fruit, with one pistillate and two staminate spikes; (16) one of its staminate flowers with the scale; (17) a pistillate scale, and (18) mature perigynium; (19) longitudinal section of the latter, showing the achene and its style, and (20) cross section of the same.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Carex

# EXPLANATION OF PLATE VII.

LEERSIA. — (1) Panicle of L. oryzoides, reduced in size; (2) a branchlet of the same, with its spikelets, of the natural size; and (3) an open spikelet in flower, enlarged.

ZIZANIA. — (1) A staminate, and (2) a pistillate flower or spikelet of Z. aquatica; (3) a magnified pistil with a pair of squamulæ or hypogynous scales; (4) a grain, and a magnified longitudinal section of the lower part of the same, showing the embryo at the outside of the base of the albumen.

ALOPECURUS. — (1) Part of a plant of A. geniculatus, in flower; (2) a few spikelets from the spike-like inflorescence, moderately magnified; (3) an open spikelet in flower, more magnified, and (4) the single flowering glume detached.

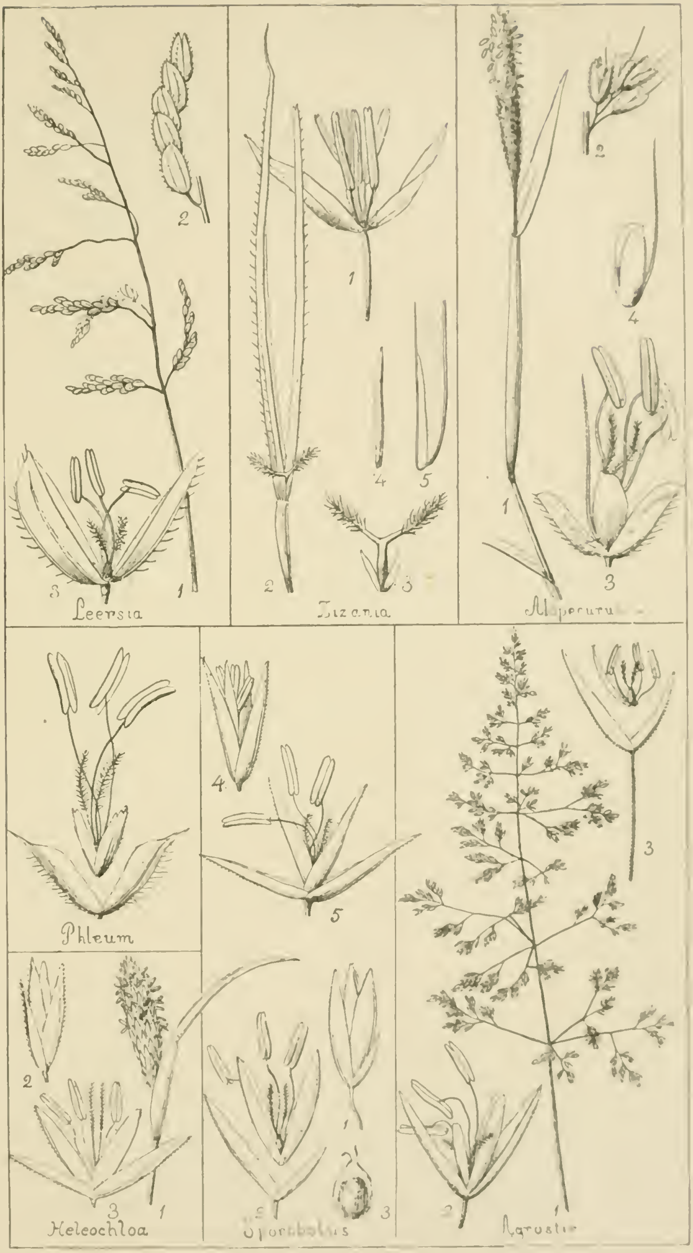
PHLEUM. — A detached spikelet of P. pratense, having the flower with its glume and palet raised above the empty glumes, magnified.

HELEOCHLOA. — (1) Inflorescence of H. schœnoides; (2) a separate enlarged spikelet; and (3) the same open, in flower.

SPOROBOLUS. — (1) A spikelet of S. cryptandrus, magnified; (2) the same, with the flower open, raised above the empty glumes; and (3) the fruit, more magnified, showing the seed loose in the pericarp (utricle). — (4) An enlarged spikelet of E. vaginæflora; and (5) the same displayed.

AGROSTIS. — (1) Panicle of A. alba, var. vulgaris, with (2) an enlarged open spikelet of the same; also (3) the rough pedicel and glumes of A. scabra, with the flower separated, the latter having no palet.

Genera of Grasses Plate VII


Leersia
Zizania
Alopecurus
Phleum
Heleochloa
Sporobolus
Agrostis

## EXPLANATION OF PLATE VIII.

POLYPOGON. — (1) Spike-like contracted panicle of P. Monspeliensis; (2) an enlarged detached spikelet, showing the long awns to the empty glumes; (3) the same open in flower; and (4) a separate flower without the empty glumes.

CINNA. — (1) A magnified spikelet of C. arundinacea; and (2) the same open, displaying the flowering glume and palet, the single stamen, and the pistil.

MUHLENBERGIA. — (1) A magnified closed spikelet of M. sylvatica; (2) the same with the open flower raised out of the empty glumes. — (3) A magnified spikelet of M. diffusa; (4) its minute and unequal empty glumes more magnified; and (5) an open spikelet of the same.

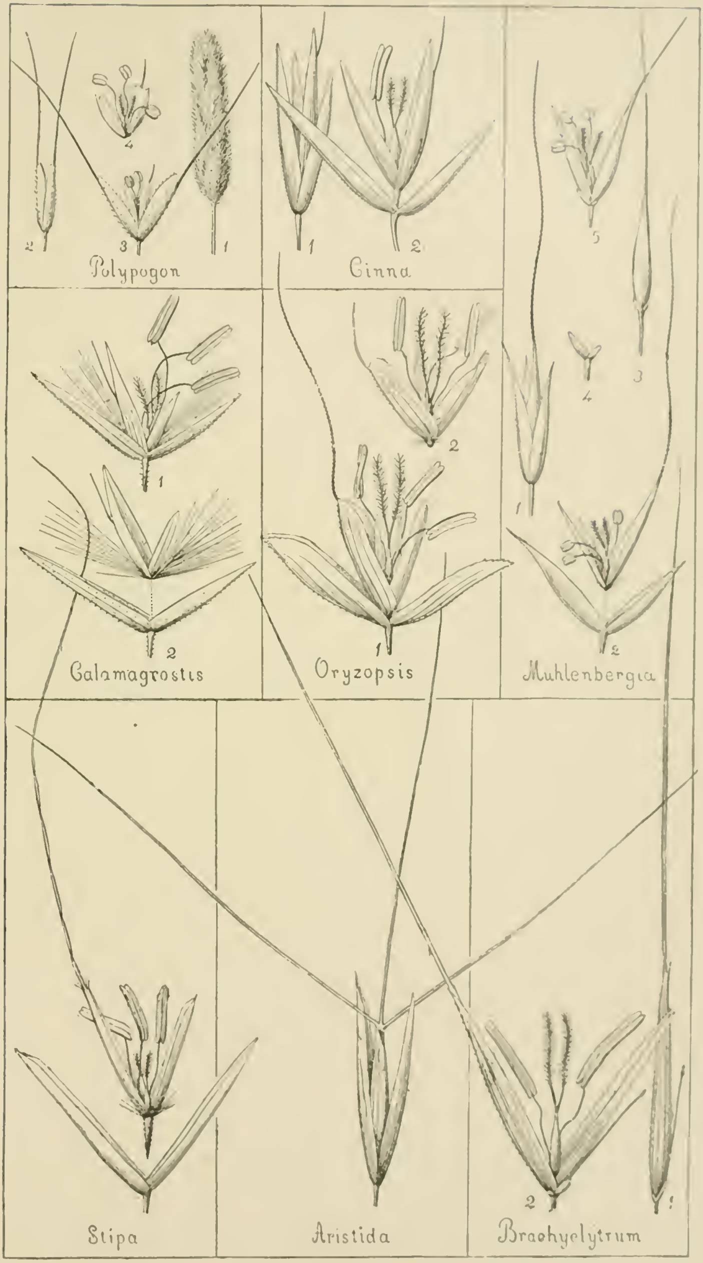
BRACHYELYTRUM. — (1) A spikelet of B. aristatum enlarged; (2) the same displayed.

CALAMAGROSTIS. — (1) An open spikelet of C. Canadensis, enlarged, displaying all the parts; (2) the same with the flower raised out of the empty glumes, showing the hairy rudiment behind the palet.

ORYZOPSIS. — (1) An open magnified spikelet of O. asperifolia; and (2) the flower of the same removed from the empty glumes. Notice the remarkably long squamulæ or hypogynous scales, which here nearly equal the glume in length.

STIPA. — Empty glumes and flower (a little separated) of S. avenacea, enlarged.

ARISTIDA. — A spikelet of A. purpurascens, enlarged.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Polypogon
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Cinna
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Muhlenbergia
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Calamagrostis
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Oryzopsis
Stipa
Aristida
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Brachyelytrum

## EXPLANATION OF PLATE IX.

SPARTINA. — (1) Portion of the inflorescence of S. stricta, of the natural size; (2) a spikelet enlarged; and (3) the same displayed, the flower raised above the empty glumes.

CTENIUM. — (1) Spike of C. Americanum; (2) a single spikelet magnified; and (3) the same displayed, the empty glumes separated.

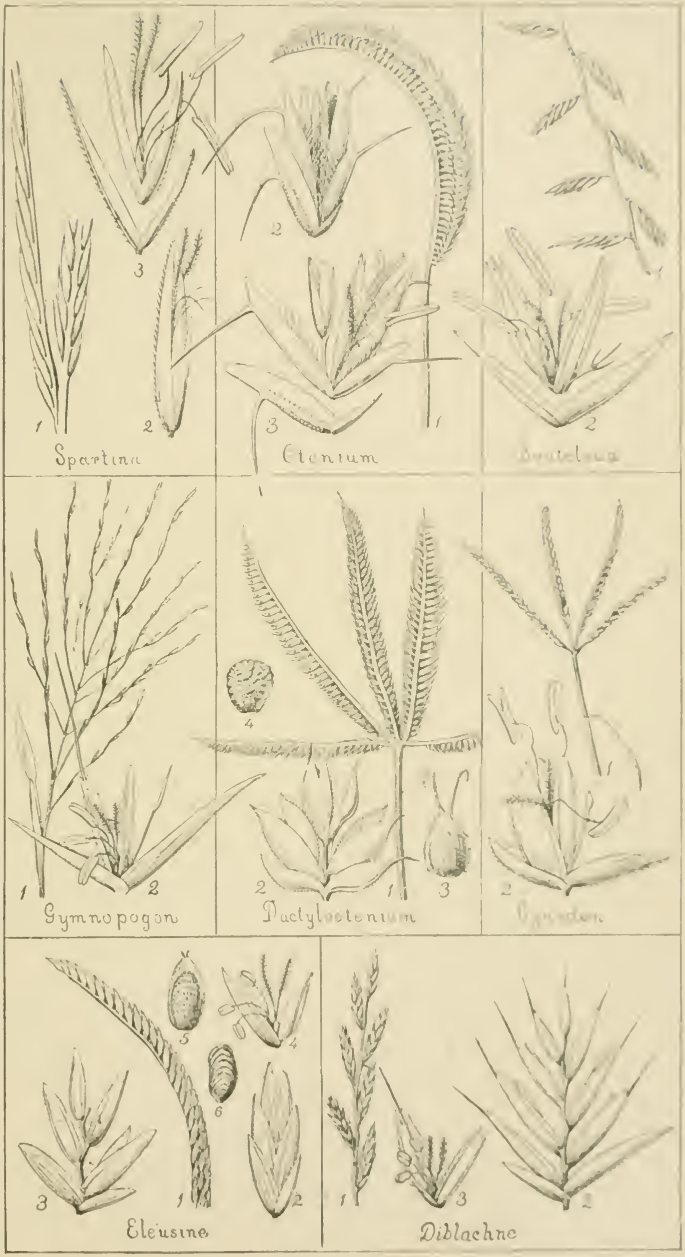
BOUTELOUA. — (1) A portion of the compound spike of B. racemosa, of the natural size; and (2) a spikelet displayed and magnified, the flowers raised out of the empty glumes.

GYMNOPOGON. — (1) Inflorescence of G. racemosus, reduced in size; and (2) a magnified spikelet with the parts displayed.

CYNODON. — (1) Inflorescence of C. Dactylon, of digitate spikes; (2) a spikelet magnified and displayed, showing a perfect flower and a rudiment.

ELEUSINE. — (1) One of the spikes from the digitate inflorescence of E. Indica; (2) a magnified spikelet; (3) the same with the flowers more displayed; (4) a flower from the last, showing its parts; (5) the fruit magnified, showing the seed loose in the utricle; and (6) the wrinkled seed detached. — (1, under *Dactyloctenium*) Inflorescence of E. Ægyptiaca, of digitate spikes; (2) one of the spikelets magnified; (3) the fruit magnified, showing the seed loose in the thin pericarp (utricle); and (4) the wrinkled seed more magnified.

DIPLACHNE. — (1) Small portion of the inflorescence of D. fascicularis; (2) one of its spikelets displayed and magnified; (3) an open flower of the same.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Spartina

Ctenium

Bouteloua

Gymnopogon

Dactyloctenium

Cynodon

Eleusine

Diblachne

# EXPLANATION OF PLATE X.

TRIODIA. — (1) Magnified spikelet of T. seslerioides; (2) the same displayed and the lowest flower open; (3) back view of the flowering glume spread out.

GRAPHEPHORUM. — (1) A magnified spikelet of G. melicoides, displayed; (2) a part of the hairy rhachis and one flower of the same.

DIARRHENA. — (1) A spikelet of D. Americana, enlarged; (2) the grain in its glume and palet.

DACTYLIS. — A spikelet of D. glomerata magnified and displayed.

KŒLERIA. — (1) A magnified spikelet of K. cristata, expanded, showing the empty glumes, the three flowers, and a rudiment; (2) lower half of a flowering glume, partly spread open; it is much more folded and keeled in its natural condition.

EATONIA. — A magnified spikelet of E. obtusata, expanded, showing the empty glumes, the two flowers, and a rudiment.

MELICA. — A magnified spikelet of M. mutica, expanded, showing the empty glumes, two perfect flowers, and an abortive one.

GLYCERIA. — (1) A magnified spikelet of G. nervata; (2) a separate flower with one joint of the rhachis; and (3) the lower half of a flowering glume, showing its form (rounded on the back, not keeled).

DISTICHLIS. — (1) A pistillate spikelet of D. maritima, enlarged; (2) a flower from the same; and (3) a flower from a staminate spikelet.

POA. — (1) Panicle of P. compressa, reduced in size; (2) a magnified spikelet; (3) a separate flower more magnified; (4) a flowering glume cut across and somewhat outspread.

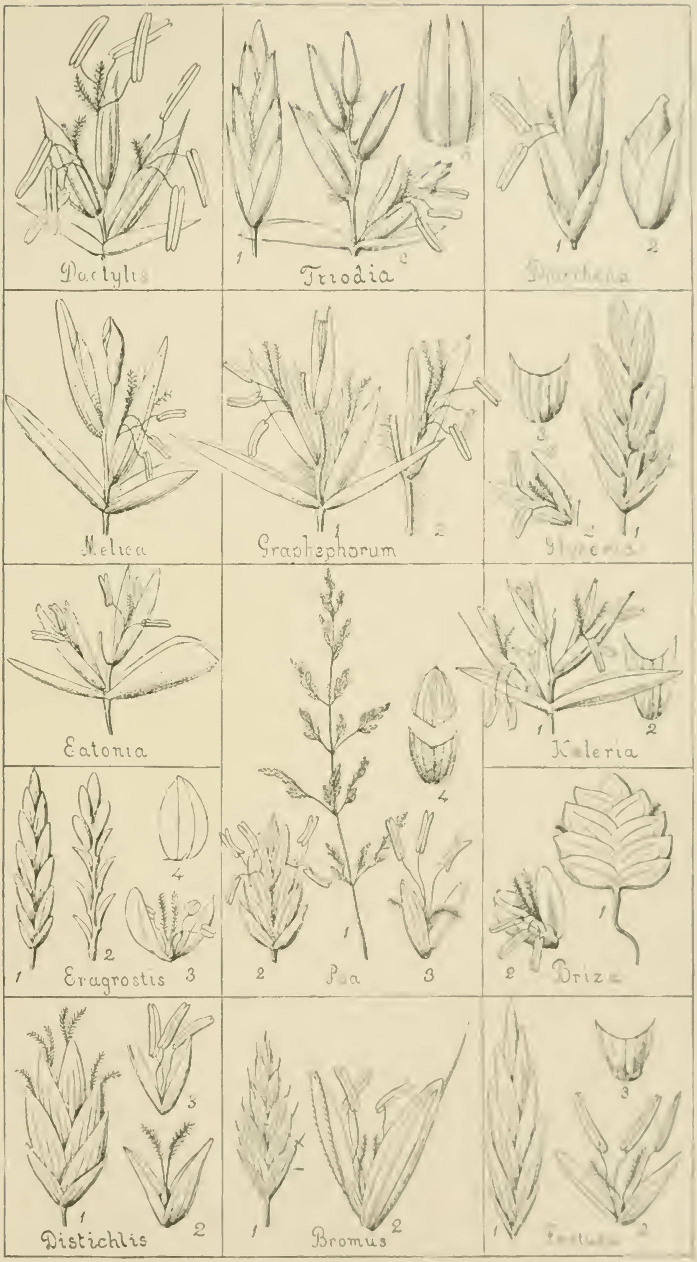
ERAGROSTIS. — (1) A spikelet of E. pilosa, enlarged; (2) the same, from which the glumes and all of six lower flowers except the palets have fallen away; (3) a magnified flower, open; (4) the flowering glume of the same outspread.

BRIZA. — (1) A spikelet of B. media, enlarged; (2) a separate flower.

FESTUCA. — (1) A spikelet of F. elatior, enlarged; (2) a separate flower; (3) lower part of a flowering glume, outspread.

BROMUS. — (1) A spikelet of B. secalinus, or Chess; and (2) a separate flower, enlarged.

Genera of Grasses Plate X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Eragrostis
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Briza
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Distichlis
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Bromus
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Festuca

## EXPLANATION OF PLATE XI.

UNIOLA. — (1) A spikelet of U. latifolia, of about the natural size; (2) a flower, enlarged; (3) empty flowering glume of the lowest (sterile) flower.

PHRAGMITES. — (1) A spikelet of P. communis, enlarged; (2) one of the perfect flowers, enlarged; and (3) the lowest flower, which has stamens only.

ARUNDINARIA. — (1) A spikelet of A. macrosperma; and (2) a separate flower, magnified.

SCHEDONNARDUS. — (1) Portion of the spike of S. Texanus, enlarged; and (2) a flower, magnified.

LOLIUM. — (1) Portion of the spike of L. temulentum; and (2) a separate flower, magnified.

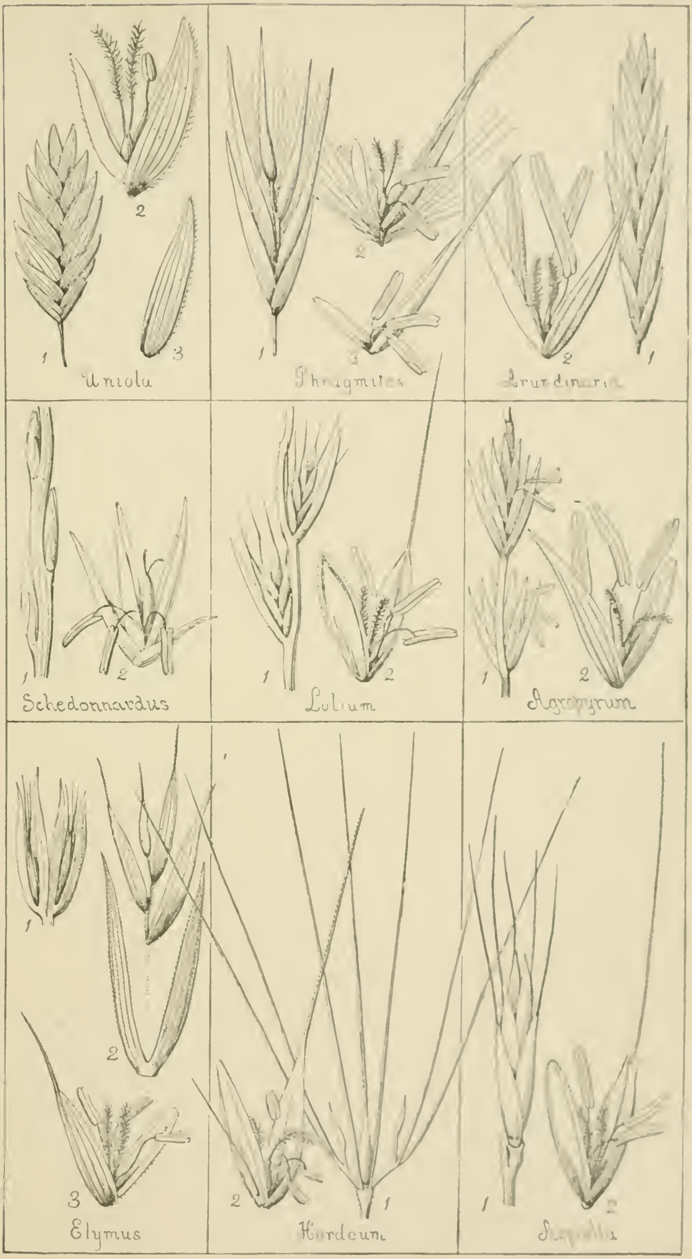
AGROPYRUM. — (1) Portion of the spike of A. repens, or Couch-Grass, of about the natural size; (2) a flower, magnified.

HORDEUM. — (1) The three one-flowered spikelets from one joint of the spike of H. jubatum, with their awn-like empty glumes, the lateral flowers abortive and neutral, the middle one alone perfect; (2) this perfect flower (with an awn-like rudiment) open and enlarged.

ELYMUS. — (1) The two spikelets of one joint of the spike of E. Virginicus, about the natural size; (2) the empty glumes and the flowers of one spikelet, enlarged and displayed; and (3) an open flower, more magnified.

GYMNOSTICHUM. — (1) A spikelet of G. Hystrix; and (2) an expanded flower, magnified.

ASPRELLA. — (1) A spikelet of A. Hystrix; and (2) an expanded flower, magnified.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3
2
1
1
2

Uniola

Phragmites

Arundinaria

Schedonnardus

Lolium

Agropyrum

Elymus

Hordeum

Sitanion

## EXPLANATION OF PLATE XII.

DESCHAMPSIA. — (1) Panicle of D. flexuosa; (2) a spikelet, magnified, the parts displayed; and (3) one of the flowers detached and open.

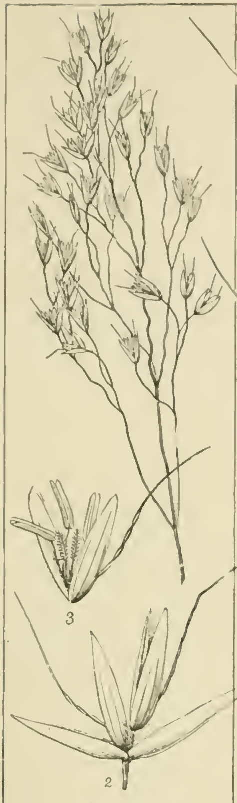
DANTHONIA. — (1) Panicle of D. spicata; (2) a spikelet enlarged; and (3) a separate flower from the same.

TRISETUM. — (1) A spikelet of T. subspicatum, var. molle, expanded and magnified; and (2) a separate open flower.

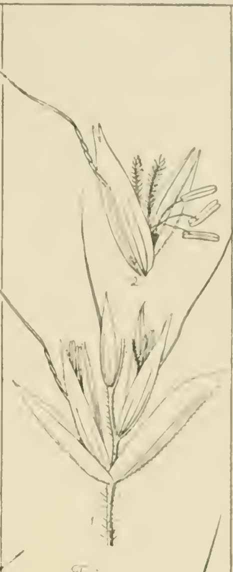
AVENA. — (1) A spikelet of A. striata, displayed and magnified; and (2) a separate flower.

ARRHENATHERUM. — A spikelet of A. avenaceum, displayed and magnified; (1) the empty glumes; (2) the flowers, the lower one staminate only, the next perfect, and the third a rudiment.

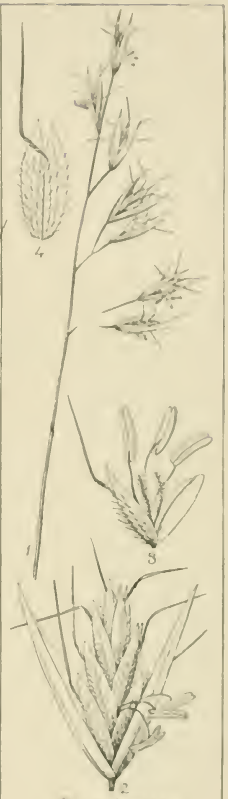
HOLCUS. — (1) A spikelet of H. lanatus, magnified; (2) the same displayed to show the two flowers, the lower perfect and awnless, the upper staminate and awned.



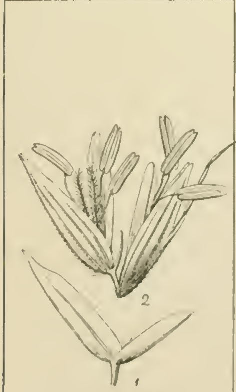
Deschampsia



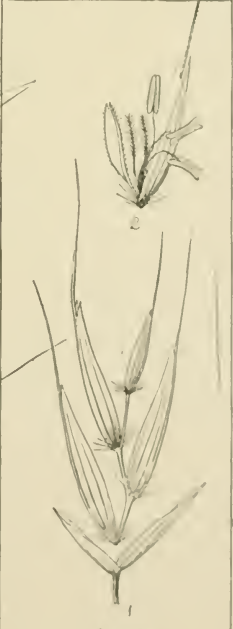
Trisetum



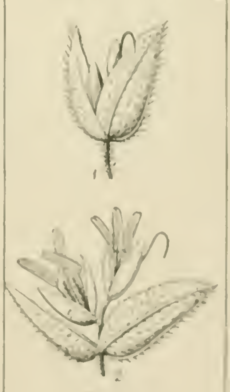
Danthonia



Arrhenatherum



Avena



Holcus

## EXPLANATION OF PLATE XIII.

HIEROCHLOA. — (1) A spikelet of H. borealis, enlarged; (2) the same displayed, the flowers separated from the empty glumes, the two lateral ones with 3 stamens and no pistil, the middle or terminal one with a pistil and only 2 stamens.

ANTHOXANTHUM. — (1) The spike-like inflorescence of A. odoratum; (2) a spikelet magnified; (3) another with the parts displayed, the flowers raised from the lower empty glumes, the lateral glumes empty and awned, the terminal flower perfect and diandrous.

PHALARIS. — (1) A spikelet of P. arundinacea, enlarged, (2) the empty glumes, and a perfect flower with a hairy rudiment on each side of it.

MILIUM. — (1) Portion of the panicle of M. effusum; (2) a closed spikelet, magnified; and (3) the same displayed.

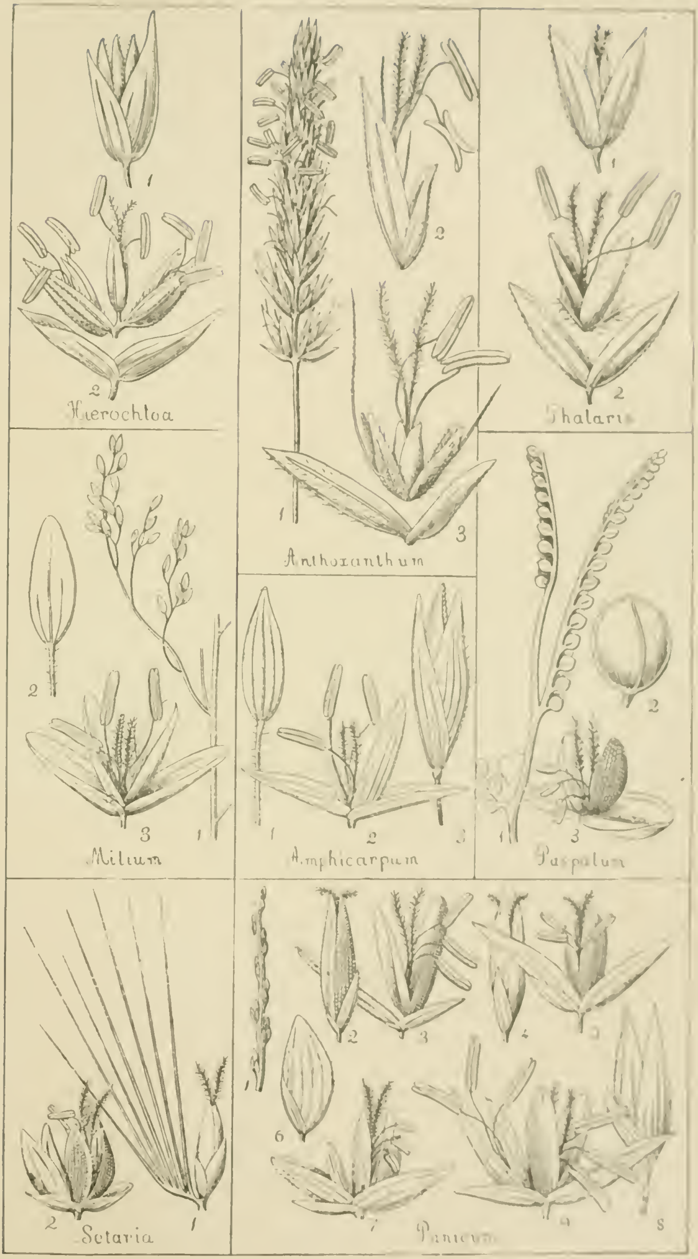
AMPHICARPUM. — (1) A spikelet from the panicle of A. Purshii, magnified; (2) the same, with the parts displayed; and (3) a radical (fertile) spikelet, enlarged.

PASPALUM. — (1) Inflorescence of P. læve; (2) a closed spikelet, enlarged; (3) the same with the parts displayed.

PANICUM. — (1) Part of a spike of P. sanguinale; (2) one of its spikelets, magnified; (3) the same with its parts displayed, the three lower glumes empty. — (4) A spikelet of P. capillare, magnified; (5) the same displayed, the three lower glumes empty. — (6) A spikelet of P. clandestinum, magnified; (7) the same displayed, the lower flower represented by a glume and palet only. — (8) A spikelet of P. virgatum, magnified; (9) the same displayed, the lower flower staminate.

SETARIA. — (1) A magnified spikelet of S. glauca, with the accompanying cluster of bristles; (2) the spikelet displayed, showing the neutral lower flower, of a glume and palet only, and the perfect flower.

Genera of Grasses Plate XIII


1
2
Hierochloa
1
2
3
Anthoxanthum
1
2
Phalaris
2
3
1
Milium
1
2
3
Amphicarpum
2
1
3
Paspalum
2
1
Setaria
1
2
3
4
5
6
7
8
9
Panicum

## EXPLANATION OF PLATE XIV.

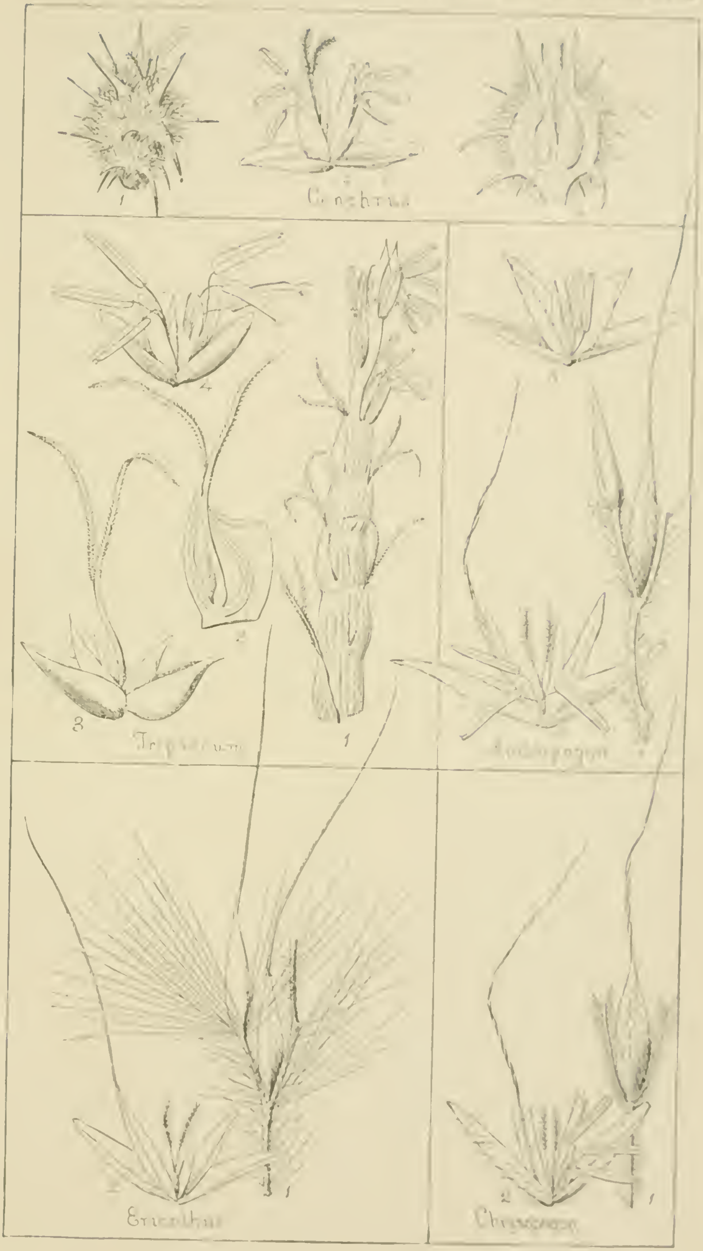
CENCHRUS. — (1) Involucre of C. tribuloides, in flower, enlarged; (2) longitudinal section of the same; (3) a spikelet displayed (the stigmas should belong to the right-hand flower; the left-hand or lower flower is only staminate).

TRIPSACUM. — (1) Piece of the spike (of the natural size), pistillate below, staminate above; (2) a longitudinal section of one of the pistillate spikelets; (3) a pistillate spikelet with its parts displayed; (4) a staminate (two-flowered) spikelet, with its parts displayed.

ERIANTHUS. — (1) Part of the hairy inflorescence with two spikelets of E. saccharoides, enlarged; (2) one of the spikelets displayed.

ANDROPOGON. — (1) Small portion of the spike of A. furcatus, enlarged, with one fertile and awned spikelet, and one staminate and awnless spikelet; (2) the fertile spikelet, and (3) the staminate spikelet, displayed.

CHRYSOPOGON. — (1) A fertile spikelet of C. nutans, enlarged, with a sterile pedicel on each side; (2) the spikelet displayed.


1
2
3
Cenchrus
4
2
3
Tripsacum
1
2
Andropogon
1
Erianthus
1
2
Chrysopogon
1

## EXPLANATION OF PLATE XV.

BECKMANNIA. — (1) Inflorescence of B. erucæformis, var., reduced in size; (2) a spike, enlarged; (3) a spikelet, and (4) the same opened; (5) the flower.

ERIOCHLOA. — (1) Inflorescence of E. polystachya, reduced; (2) a spikelet, enlarged, and (3) the same opened; (4) the flower opened.

ROTTBŒLLIA. — (1) Portion of the spike of R. rugosa, somewhat reduced, and (2) a portion enlarged, with (3) the fertile spikelet and (4) the pedicelled sterile spikelet of the middle joint displaced; (5) the fertile spikelet opened; (6) the third empty glume, and (7) the flower.

AMMOPHILA. — (1) Inflorescence of A. arundinacea, reduced; (2) a spikelet, enlarged, and (3) the flower, with a hairy rudiment at the base of the palet.

LEPTOCHLOA. — (1) Inflorescence of L. mucronata, reduced; (2) portion of rhachis of a spike, bearing two spikelets; (3) a 3-flowered spikelet; and (4) a flower removed.

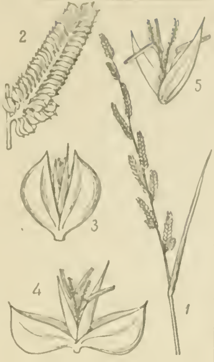
BUCHLOË. — (1) Staminate and (2) pistillate inflorescence of B. dactyloides; (3) a staminate spikelet, and (4) one of its flowers removed; (5) a pistillate spikelet, enlarged; (6) vertical section of same; and (7) the outer empty glume removed.

MUNROA. — (1) Inflorescence of M. squarrosa; (2) a spikelet, enlarged; and (3) a flower, opened.

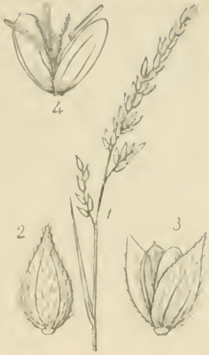
SCOLOCHLOA. — (1) Inflorescence of S. festucacea, reduced; (2) a spikelet, enlarged; and (3) a flower.

PUCCINELLIA. — (1) Inflorescence of P. maritima, reduced; (2) a spikelet, enlarged; and (3) a flower.

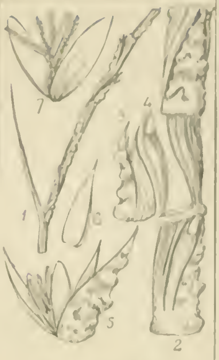
Genera of Grasses. Plate XV



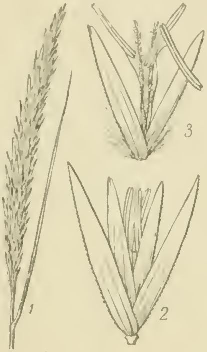
Beckmannia.



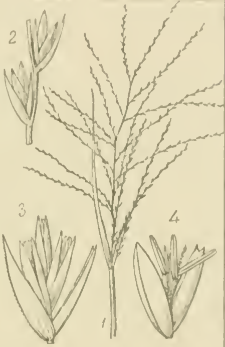
Eriochloa



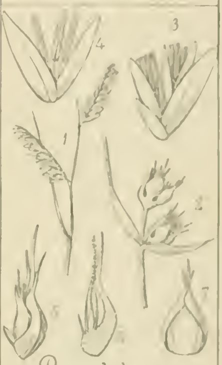
Rottboellia



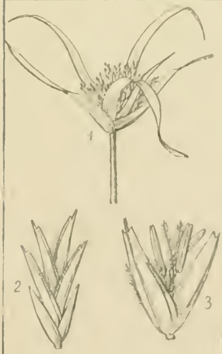
Ammophila.



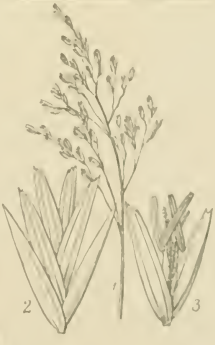
Leptochloa.



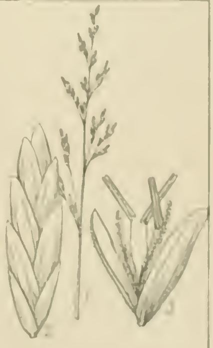
Buchloe.



Munroa



Scolochloa



Puccinellia

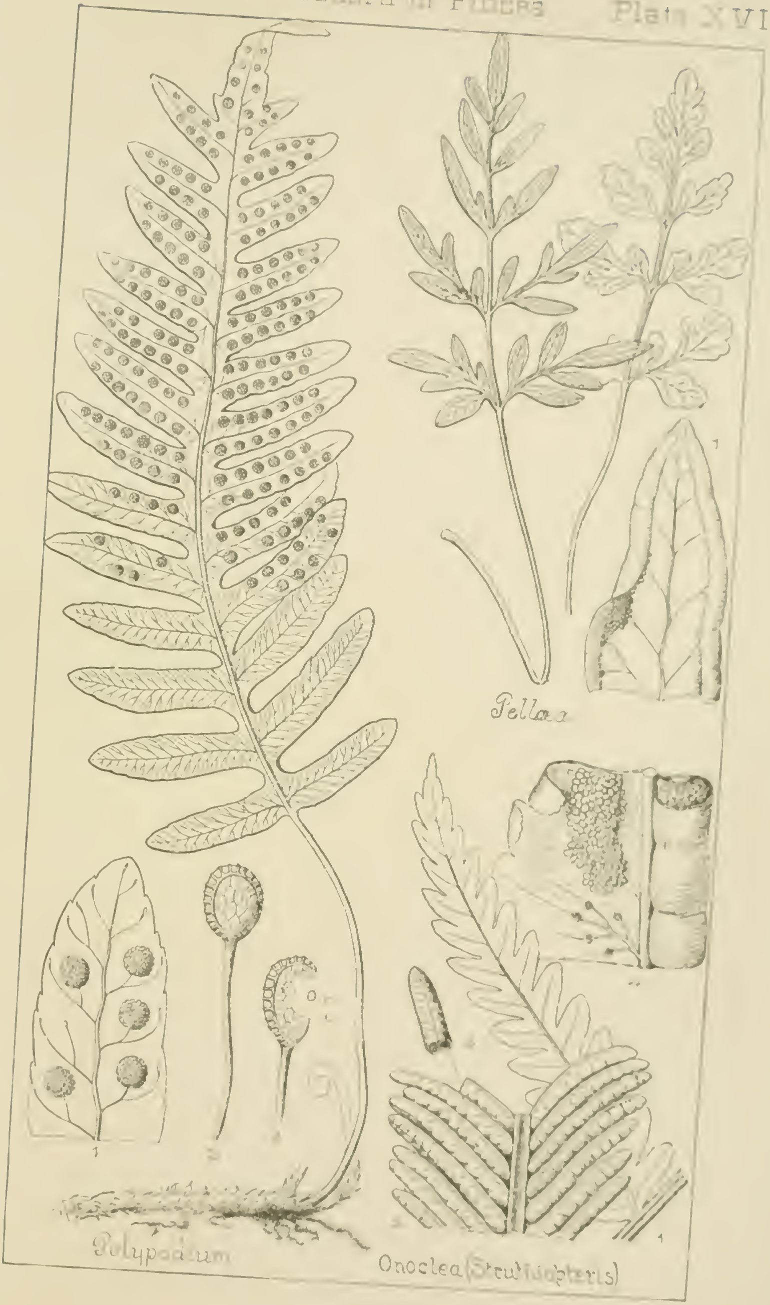
## EXPLANATION OF PLATE XVI.

POLYPODIUM. — Plant of P. vulgare; piece of the frond; a magnified sporangium with its stalk, and another bursting and discharging spores.

ONOCLEA. — (1) Pinna of the sterile frond of O. Struthiopteris; (2) portion of a fertile frond; (3) a piece of one pinna cut off to show the manner in which it is rolled up; and (4) a portion of the last, magnified, with one side unrolled; toward the base the sporangia all removed, to show how the fruit-dots are borne each on the middle of a vein.

PELLÆA. — Sterile and fertile plants of P. gracilis, and (1) a portion of the fertile frond enlarged, with a piece of the marginal indusium turned back to display the fruit; the sporangia are all removed from the fruit-bearing tips of the two forks of the lower vein.

Genera of Filices Plate XVI



Pellaea

Polypodium

Onoclea (Struthiopteris)

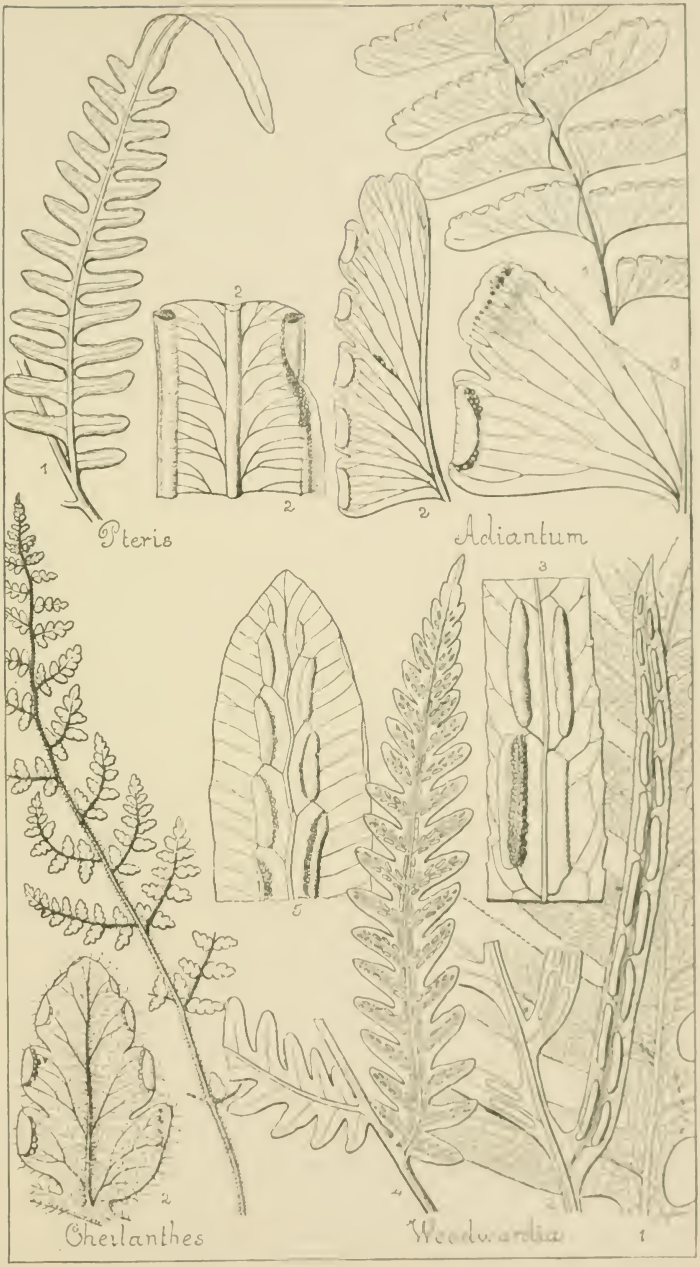
## EXPLANATION OF PLATE XVII.

PTERIS. — A pinnule of P. aquilina, and (2) a piece of one of the lobes, enlarged, the marginal indusium rolled back on one side, displaying the fruit; the sporangia all removed from the lower part to show the receptacle that bears them, viz. a cross-line connecting the tips of the veins.

ADIANTUM. — (1) Piece of the frond of A. pedatum; (2) a pinnule somewhat enlarged; and (3) a piece of one more enlarged, with the indusium of one fruit-dot turned back to show the attachment of the fruit.

CHEILANTHES. — (1) Small plant of C. vestita; and (2) a fruit-bearing pinnule, enlarged.

WOODWARDIA. — (1) Portion of the sterile and (2) of the fertile frond of W. angustifolia; (3) a piece of the latter, enlarged; (4) piece of the frond of W. Virginica; and (5) part of a fruiting lobe, enlarged.


1
2
2
Pteris
2
3
Adiantum
3
5
Cheilanthes
2
4
Woodwardia
1

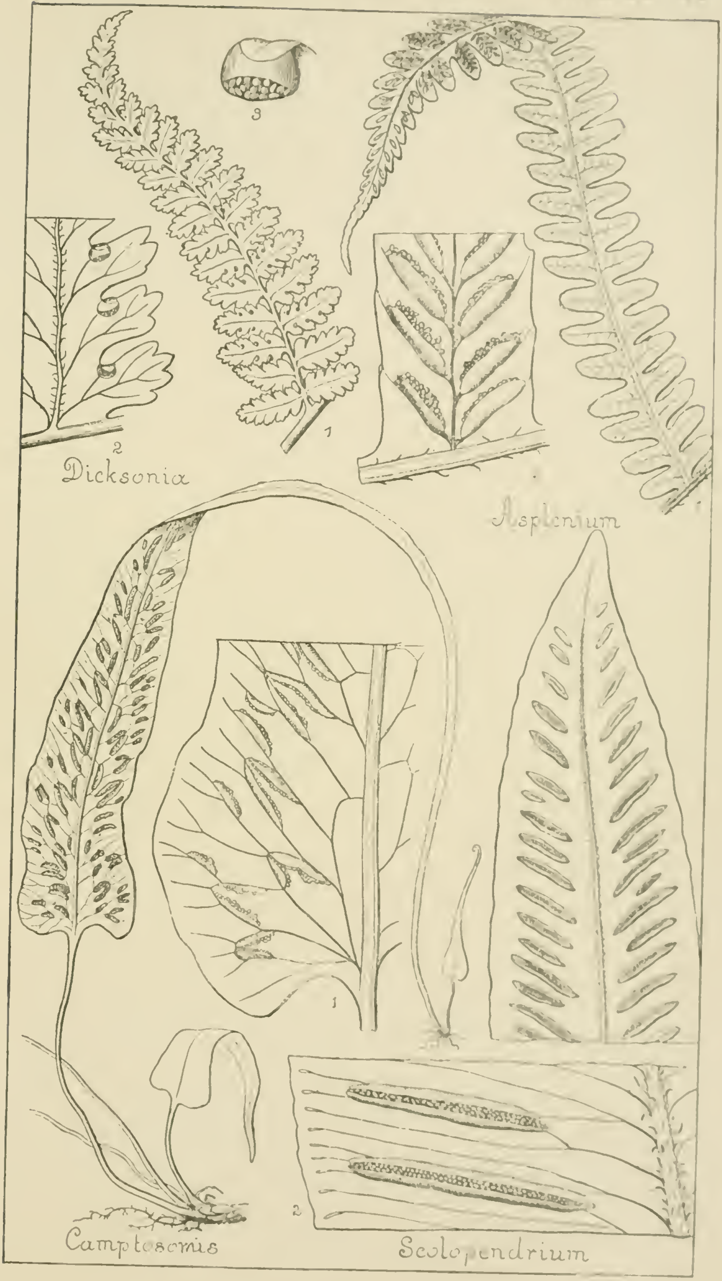
## EXPLANATION OF PLATE XVIII.

CAMPTOSORUS. — Plant of C. rhizophyllus, and (1) a portion of a frond, with fruit-dots, enlarged.

SCOLOPENDRIUM. — Tip of a fertile frond of S. vulgare; and (2) a piece enlarged, with two fruit-dots.

ASPLENIUM. — (1) A pinna of A. thelypteroides; and (2) part of a lobe in fruit, enlarged.

DICKSONIA. — (1) Pinna of D. pilosiuscula; (2) portion of a pinnule, enlarged; and (3) a fruit dot in its cup-shaped indusium.


3
2
1
Dicksonia
Asplenium
1
Camptosorus
2
Scolopendrium

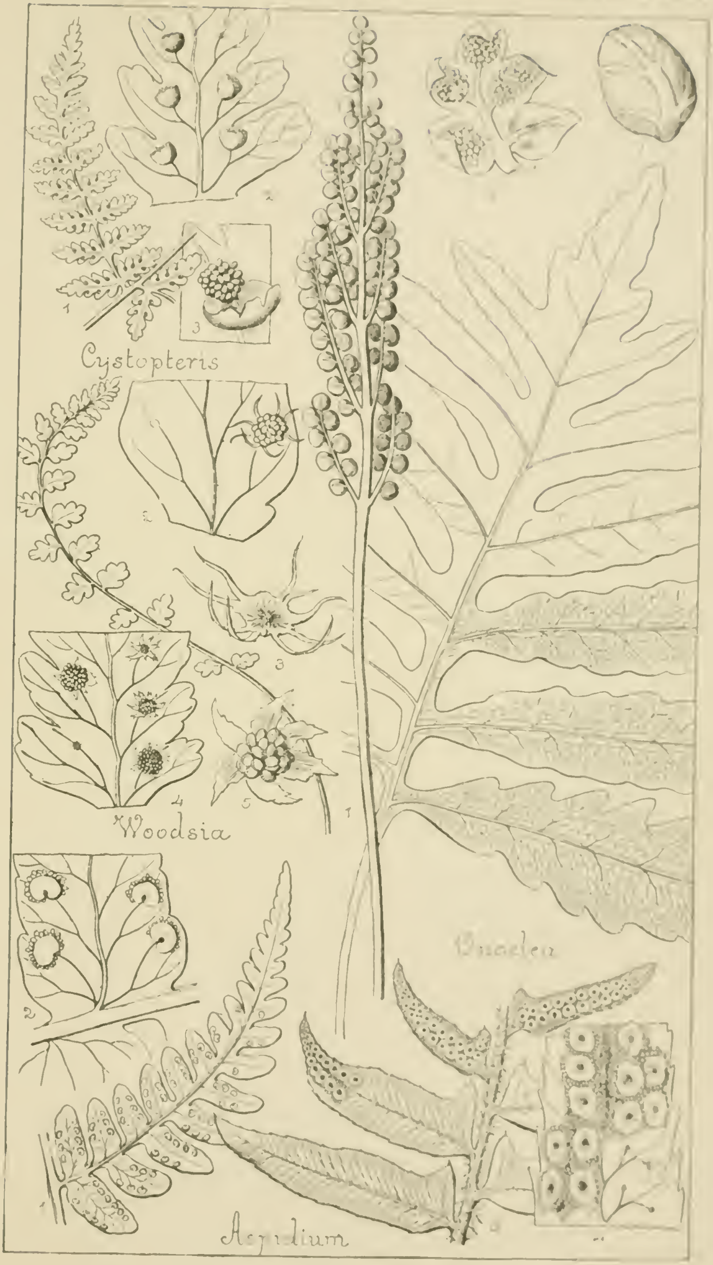
## EXPLANATION OF PLATE XIX.

CYSTOPTERIS. — (1) Piece of the frond of C. bulbifera; (2) a lobe in fruit, enlarged; and (3) a small portion more magnified, bearing a fruit-dot with its indusium thrown back.

WOODSIA. — (1) Small frond of W. glabella; (2) a part of a fruiting pinna of the same, magnified; and (3) a separate indusium, more magnified; (4) a piece of a fruitful pinnule of W. obtusa, enlarged; and (5) a fruit with the opened indusium beneath, more magnified.

ASPIDIUM. — (1) Pinna of A. (Dryopteris) marginale; and (2) a magnified fruiting portion; (3) piece of A. (Polystichum) acrostichoides; and (4) a small fruiting portion, magnified.

ONOCLEA. — Sterile and fertile frond of O. sensibilis; (1) front view of a fruiting contracted pinnule, enlarged; and (2) the same laid open and viewed from the other side; on one lobe the sporangia are removed from the veins.


1
2
3
Cystopteris
2
3
4
5
1
Woodsia
1
Onoclea
2
1
Aspidium

## EXPLANATION OF PLATE XX.

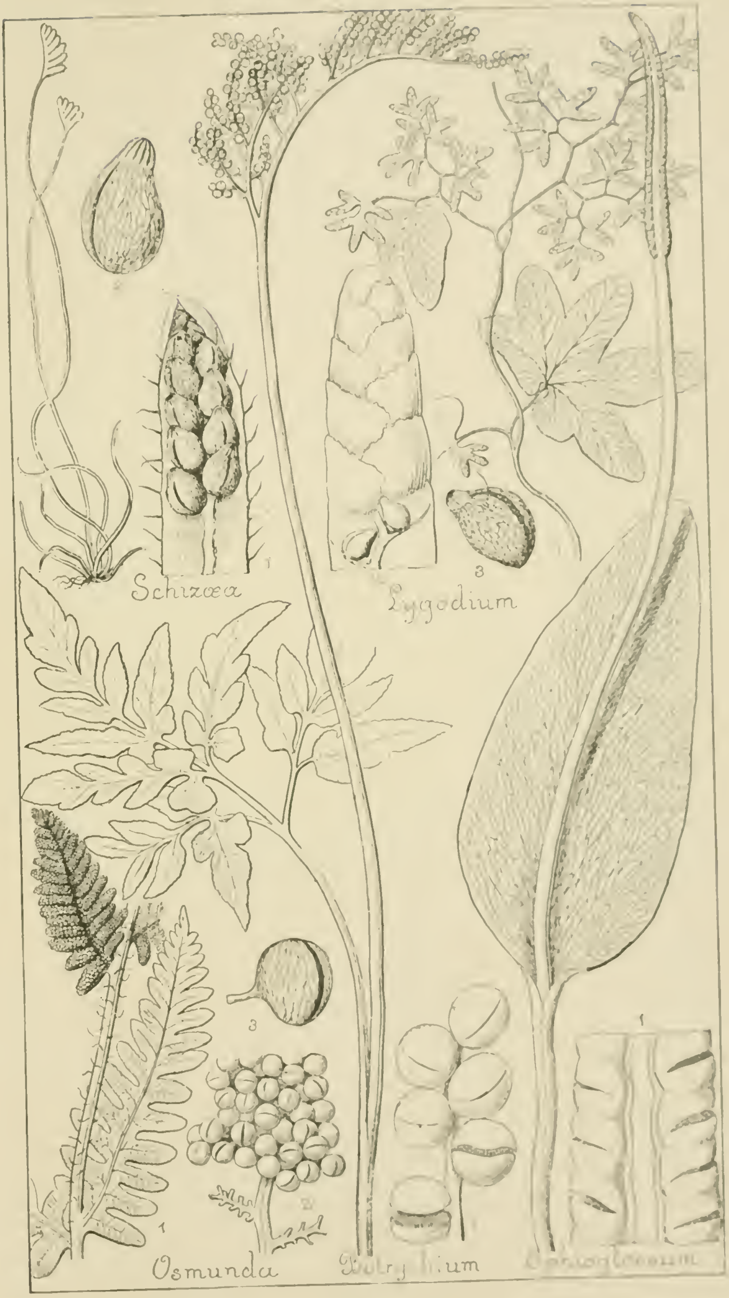
SCHIZÆA. — Plant of S. pusilla, of the natural size; (1) a fertile pinna with eleven sporangia, magnified; and (2) a separate sporangium, more magnified.

LYGODIUM. — (1) Summit of frond of L. palmatum, with fertile and sterile divisions; (2) a fruiting lobe enlarged, with two of the lower scales, or indusia, removed, displaying a sporangium under each; and (3) a sporangium more magnified.

OSMUNDA. — (1) Small piece of the frond of O. Claytoniana, with a fertile and a sterile pinna; (2) a portion of the fruit magnified; and (3) one sporangium more magnified.

BOTRYCHIUM. — Plant of B. ternatum, and (1) a portion of the fruit, with six sporangia, magnified.

OPHIOGLOSSUM. — Frond of O. vulgatum, and (1) a portion of the fruiting spike enlarged.


2
1
Schizæa
3
Lygodium
3
1
2
Osmunda
Botrychium
1
Ophioglossum

## EXPLANATION OF PLATE XXI.

EQUISETUM. — (1) Upper part of fertile plant of E. limosum; (2) one of the shield shaped scales or receptacles of the spike, with the six sporangia underneath, enlarged; (3) same seen from below, discharging the spores; (4) a magnified spore with the club-shaped filaments spreading; and (5) the same with the filaments coiled up.

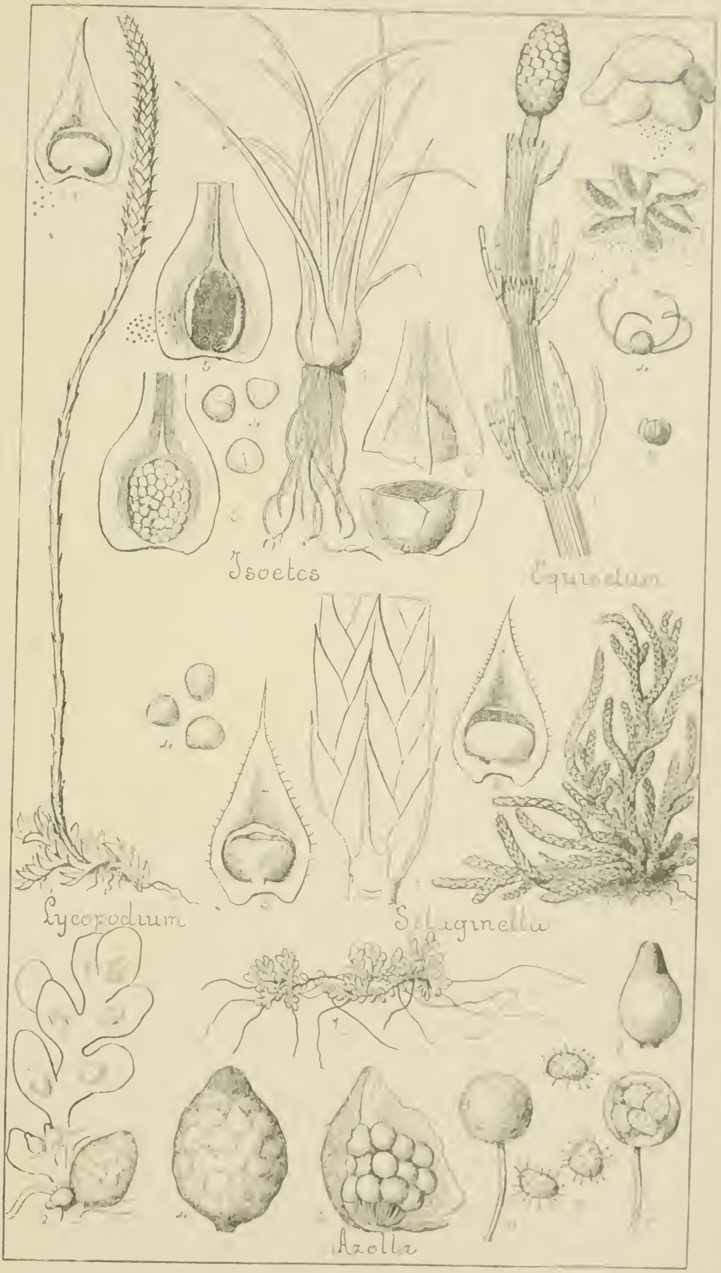
LYCOPODIUM. — Plant of L. Carolinianum, and (1) a magnified scale of the spike removed, with the sporangium in its axil, discharging powdery spores.

SELAGINELLA. — Plant of S. rupestris; (1) part of a fertile spike, enlarged; (2) scale from the upper part of it, with its sporangium, containing innumerable powdery spores; (3) scale from the base, with its sporangium containing few large spores; and (4) three large spores.

ISOETES. — (1) Plant of I. lacustris; (2) sporocarp containing the minute spores, cut across, enlarged; (5) same divided lengthwise; (3) sporocarp with the large spores, divided lengthwise; and (4) three large spores more magnified.

AZOLLA. — (1) Plant; (2) a portion magnified, with conceptacles of both kinds; (3) the macrosporic one, more magnified; (4) the microsporic one, more magnified; (5) the same burst open, showing the stalked microsporangia; (6) one of the latter more magnified; (7) another bursting; and (8) three masses of microspores beset with glochidiate or barbed bristles.

Gen. of Lycopodiaceæ, Equisetaceæ, &c. Pl. XXI


Isoetes
Equisetum
Lycopodium
Selaginella
Azolla

## EXPLANATION OF PLATE XXII.

RICCIA. — Plant of R. natans; section of thallus, showing two imbedded capsules and numerous air cavities; spores enclosed in a mother-cell; three free spores; and calyptra with style.

ANTHOCEROS. — Plant of A. lævis; portion of the columella and valves of the capsule, with spores and elaters; two spores and two elaters.

NOTOTHYLAS. — Plants of N. orbicularis; section of the thallus through the involucre; apex of protruding capsule; lower half of capsule showing the columella; upper half of capsule; a gemma; an antheridium; twelve free spores, and two clusters of spores (4 in each).

ASTERELLA. — Plant of A. hemisphærica; ♀ receptacle viewed from above; the same from below; capsule dehiscing, with remains of calyptra at base; section of ♂ disk; an elater, a portion of same, and spores.

SPHÆROCARPUS. — Plant of S. terrestris; cluster of five involucres; involucre enclosing a capsule; capsule filled with spores; and three spores.

DUMORTIERA. — Portions of ♂ and ♀ plants of D. hirsuta; ♀ receptacle showing three involucres, two with capsules; capsule with calyptra; section of ♂ disk; elater and portion of same; spores.

AITONIA. — Plant of A. Wrightii; upper view of ♀ receptacle with three involucres; side view of same; involucre partly cut away showing capsule and remains of calyptra; a capsule closed, and dehiscent; an elater, a piece of same, and spores.

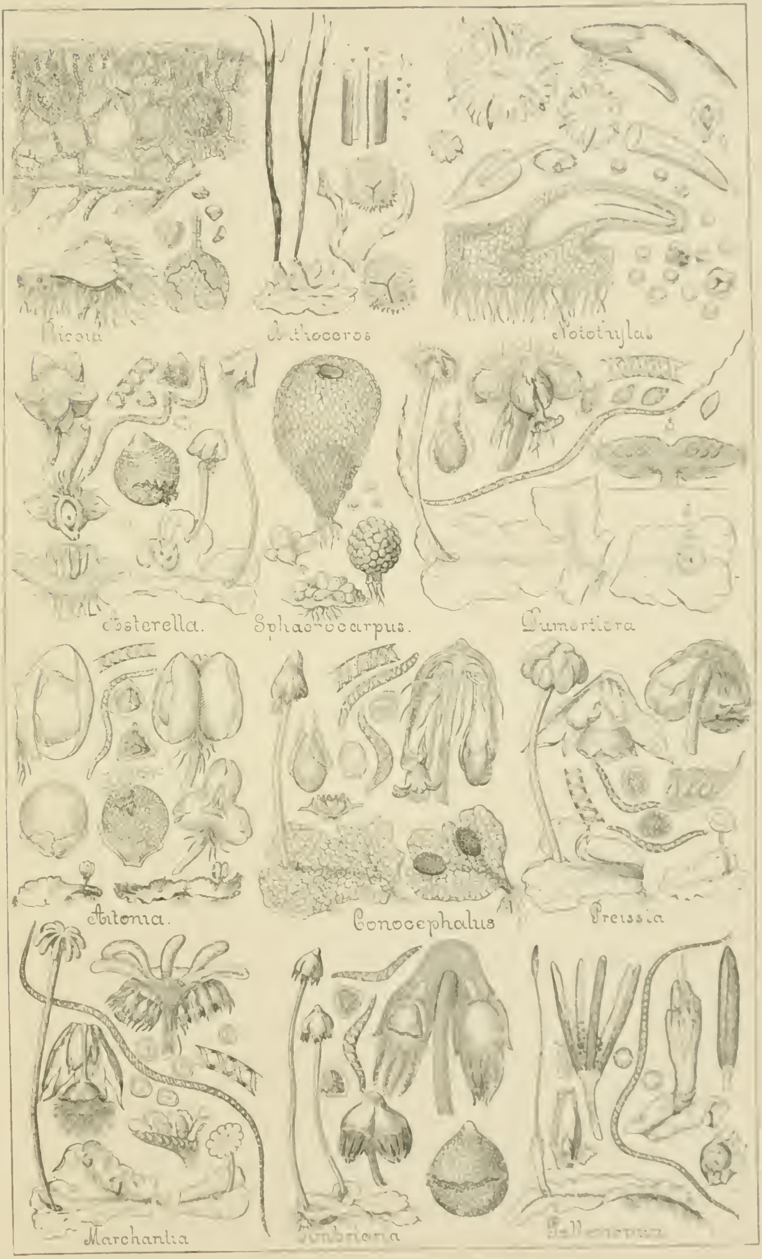
CONOCEPHALUS. — Parts of ♂ and ♀ plants of C. conicus; section of ♀ receptacle, showing two involucres and capsules; capsule with ruptured calyptra; section of ♂ disk; elaters, a portion of one, and spores.

PREISSIA. — Parts of ♂ and ♀ plants of P. commutata; section of ♀ receptacle; perianth opened showing calyptra and capsule; section of part of ♂ disk; elaters, a part of one, and spores.

MARCHANTIA. — Parts of ♂ and ♀ plants of M. polymorpha; section of receptacle; perianth, calyptra, and capsule; section of part of ♂ disk; an elater, part of same, and spores.

FIMBRIARIA. — Plant of F. tenella; ♀ receptacle, and section of same; capsule dehiscing; elaters and spores.

PALLAVICINIA. — Plant of P. Lyellii; part of thallus with involucre, perianth, and calyptra; perianth cut away showing young calyptra; capsule closed, and dehiscent; antheridium enclosed in a leaf; elater and spores.


Riccia
Anthoceros
Notothylas
Asterella.
Sphaerocarpus.
Dumortiera
Aitonia.
Conocephalus
Preissia
Marchantia
Fimbriaria

# EXPLANATION OF PLATE XXIII.

PELLIA. — Plant of P. epiphylla; calyptra with base of pedicel; capsule; an elater, part of same, two spores, and two antheridia.

BLASIA. — Plants of B. pusilla; section of cavity at the end of the midrib showing young perianth and calyptra; end of thallus with calyptra and protruding capsule; capsule dehiscing; elaters and spores; part of elater and two spores; ♂ thallus with two antheridia; gemmiparous thallus with two receptacles; section of a receptacle showing enclosed gemmæ and the protruded orifice.

METZGERIA. — Plants (♂, ♀, and gemmiparous) of M. furcata, and parts of same enlarged; hispid perianth with 2-lobed involucral leaf and base of pedicel; a gemma; an antheridium; elaters and spores.

ANEURA. — Plants (♂ and ♀) of A. sessilis; section of fleshy calyptra with base of pedicel; dehiscing capsule bearded by persistent elaters; elater, part of same, and spores; part of thallus with long deflexed ♂ receptacles, and one cut transversely showing antheridia.

FOSSOMBRONIA. — Plant of F. pusilla, and a part enlarged; capsule dehiscing, with perianth and involucral leaves; part of stem with two leaves and dorsal antheridia; an antheridium, elaters, and spores.

GEOCALYX. — Plant of G. graveolens; two pairs of leaves with underleaves; part of stem with an underleaf; section of involucre showing calyptra and base of pedicel; dehiscent capsule; elaters and spores.

GRIMALDIA. — Parts of ♂ and ♀ plants of G. barbifrons; section of ♂ disk; ♀ receptacle and section of same; dehiscent capsule; elaters and spores.

CHILOSCYPHUS. — Plant of C. ascendens; a leaf with underleaf; a pair of leaves with antheridia; a part of stem with involucral leaves, perianth, and calyptra; dehiscent capsule; elaters and spores.

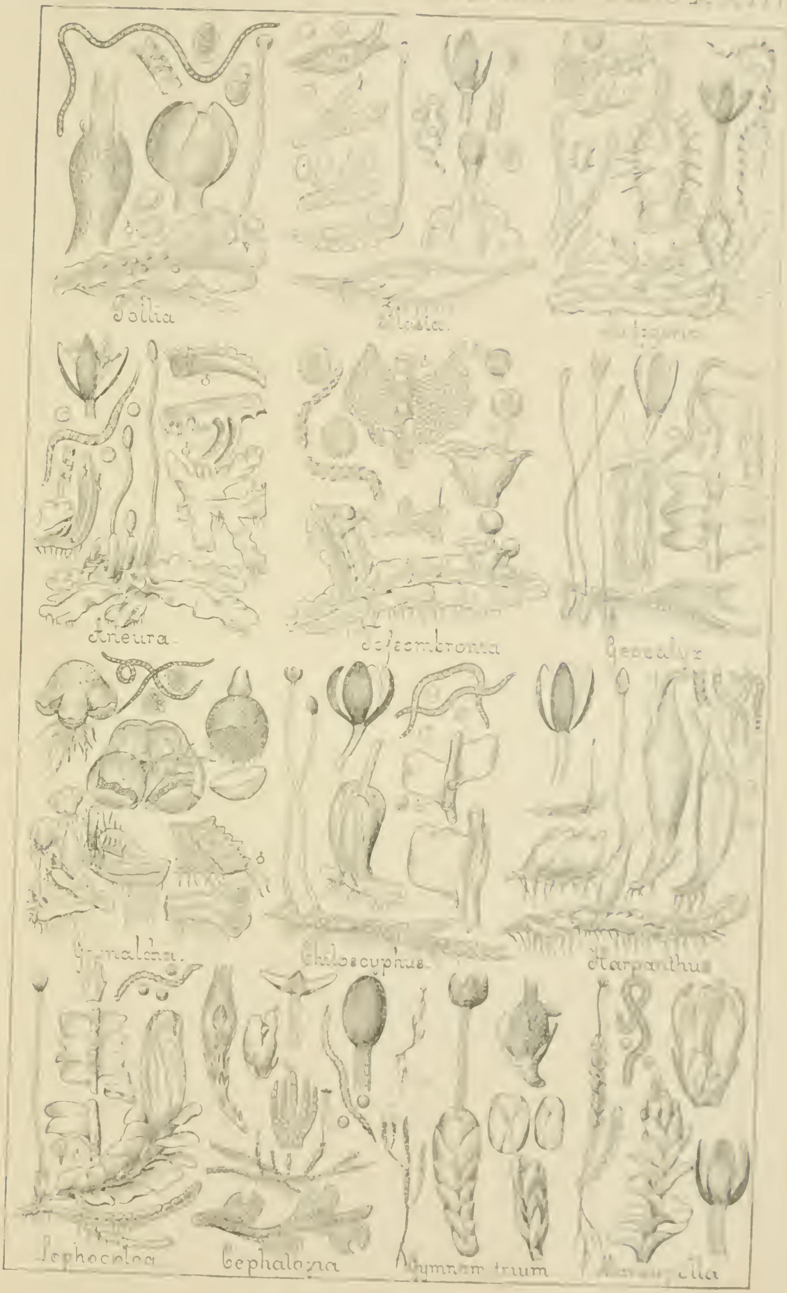
HARPANTHUS. — Plant of H. Flotovianus, and same enlarged; a pair of leaves with underleaf; perianth with involucral leaves, and section showing calyptra; elaters, a part of one, and spores.

LOPHOCOLEA. — Plant of L. heterophylla; a part enlarged with involucral leaves and perianth; cross-section of perianth; three pairs of leaves with underleaves; a leaf and antheridium; an underleaf; an elater and spores.

CEPHALOZIA. — Plant of C. multiflora; two pairs of leaves; perianth with involucral leaves; an involucral leaf; calyptra; capsule closed, and dehiscent; an elater and spores.

GYMNOMITRIUM. — Plants of G. concinnatum; three pairs of leaves; apex of stem with involucral leaves and dehiscent capsule; two involucral leaves; calyptra.

MARSUPELLA. — Plant of M. emarginata; part of same with involucral leaves; involucre and perianth opened showing calyptra and base of pedicel; capsule; elater and spores.


Pellia
Blasia
Aneura
Fossombronia
Geocalyx
Grimaldia.
Chiloscyphus
Harpanthus
Lophocolea
Cephalozia
Gymnomitrium
Marsupella

# EXPLANATION OF PLATE XXIV.

SCAPANIA. — Plant of S. undulata; apex of stem with involucral leaves and perianth enclosing calyptra; three pairs of leaves, a capsule, elater, and spores.

PLAGIOCHILA. — Plant of P. interrupta; five leaves; an underleaf; perianth enclosing calyptra; antheridia, capsule, elaters, and spores.

ODONTOSCHISMA. — Plant of O. Sphagni; parts of stems, one bearing gemmæ, the other a perianth with involucral leaves; an involucral leaf; a capsule, elaters, and spores.

LEJEUNEA. — Plant of L. clypeata; perianth with capsule and involucral leaves; cross section of perianth; part of stem with ♂ branch; leaves with underleaves; elaters and spores.

FRULLANIA. — Plant of F. Asagrayana; two pairs of leaves seen from above, and from below with underleaves and ventral lobes; perianth with involucral leaves; cross-section of perianth; involucral leaf; capsule, elaters, and spores.

PORELLA. — Plant of P. platyphylla; a pair of leaves with underleaves; part of stem with ♂ spikes; an antheridium in its leaf; perianth with involucral leaves and capsule; an elater, and spores.

RADULA. — Plant of R. obconica; end of branch with perianth and capsule and lateral ♂ branches; a ♂ branch; an antheridium; leaves seen from above and below; a capsule, elater, and spores.

PTILIDIUM. — Plant of P. ciliare; a pair of leaves; an underleaf; perianth with involucral leaves; capsule, elater, and spores.

BAZZANIA. — Plant of B. trilobata; two pairs of leaves with underleaves and ♂ spike; portion of ♂ spike and antheridium; capsule, elaters, and spores.

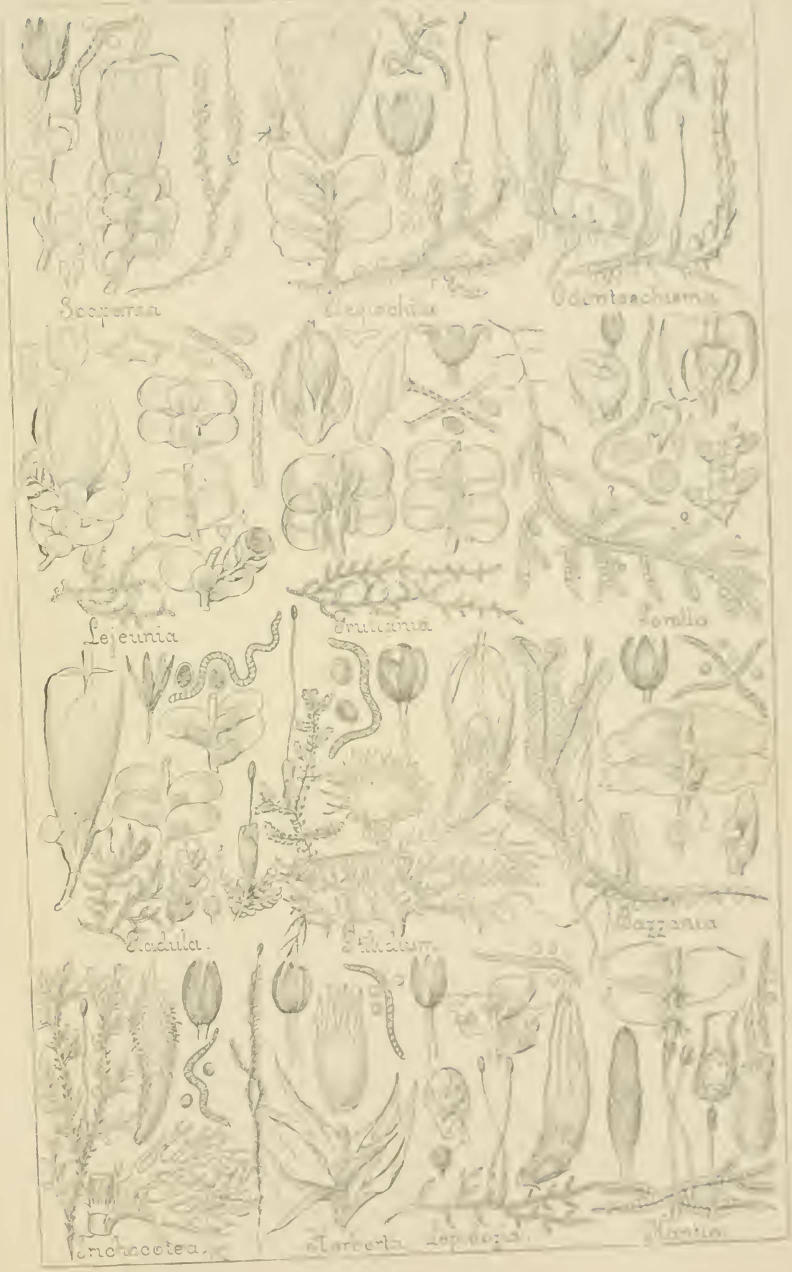
TRICHOCOLEA. — Plant of T. tomentella; leaf and underleaf; capsule; elater and spores.

HERBERTA. — Plant of H. adunca; portion with leaves and underleaves; perianth; capsules; elater and spores.

LEPIDOZIA. — Plant of L. reptans; portion with leaves and underleaves; antheridium in its leaf and free; perianth with involucre; capsule, elater, and spores.

KANTIA. — Plant of K. Trichomanis; leaves and underleaves; hairy involucre, and section showing calyptra; capsule with spiral valves; elater and spores.

Genera of Hepaticae. Plate XXXIV


Scapania
Plagiochila
Odontoschisma
Lejeunia
Frullania
Porella
Radula.
Ptilidium
Bazzania
Trichocolea.
Herberta
Lepidozia
Kantia

## EXPLANATION OF PLATE XXV.

JUBULA. — Plant of typical J. Hutchinsiæ, enlarged; two pairs of leaves seen from below; a lower lobe separate and divided; a perianth with its outer involucre and the dehiscent capsule; an elater.

BLEPHAROSTOMA. — Plant of B. trichophylla, and same enlarged; perianth with the outer involucre, ventral side; two cross-sections of perianth; portion of the margin of its orifice, expanded.

LIOCHLÆNA. — Plant of L. lanceolata; end of fertile branch, with two leaves, two involucral leaves, and young perianth; summit of perianth; perianth and involucre, the capsule protruding; capsule on its pedicel, with remains of calyptra; capsule dehiscent.

MYLIA. — Plants of M. Taylori, enlarged; portion of stem, seen from beneath; a cauline leaf (below); an underleaf; an involucral leaf (above); perianth partly cut away, showing the calyptra and exserted dehiscent capsule.

DYPLOPHYLLUM. — Plant of typical D. albicans, enlarged; a folded leaf; a leaf with the upper lobe expanded to show the nerve; an involucral leaf seen from without, and from within; perianth, cut longitudinally; calyptra.

NARDIA. — Plant of N. crenulata (a slender small-leaved form), enlarged; portion of upper stem with leaves; perianth; calyptra; elater and spores.

JUNGERMANNIA. — § 1. Plants of J. Schraderi, natural size and enlarged; two leaves; two underleaves; involucre; summit of perianth. — § 2. Plant of J. barbata, enlarged; portion of stem with leaves and underleaves; perianth with involucre; involucre. — § 3. Plant of J. Helleriana, enlarged; summit of stem with leaves, involucre, and perianth; involucral leaves; margin of perianth unfolded. — § 4. Plants of J. inflata, natural size and enlarged; cauline leaves; involucral leaf.

LUNULARIA. — Sterile and fruiting plants of L. vulgaris, enlarged; section of involucre, showing calyptra and capsule; lunate receptacle of sterile plant, with gemmæ.

MARSILIA. — Portion of plant of M. quadrifolia; a sporocarp; sporocarp burst in water and extruding the gelatinous ring with compartments attached.

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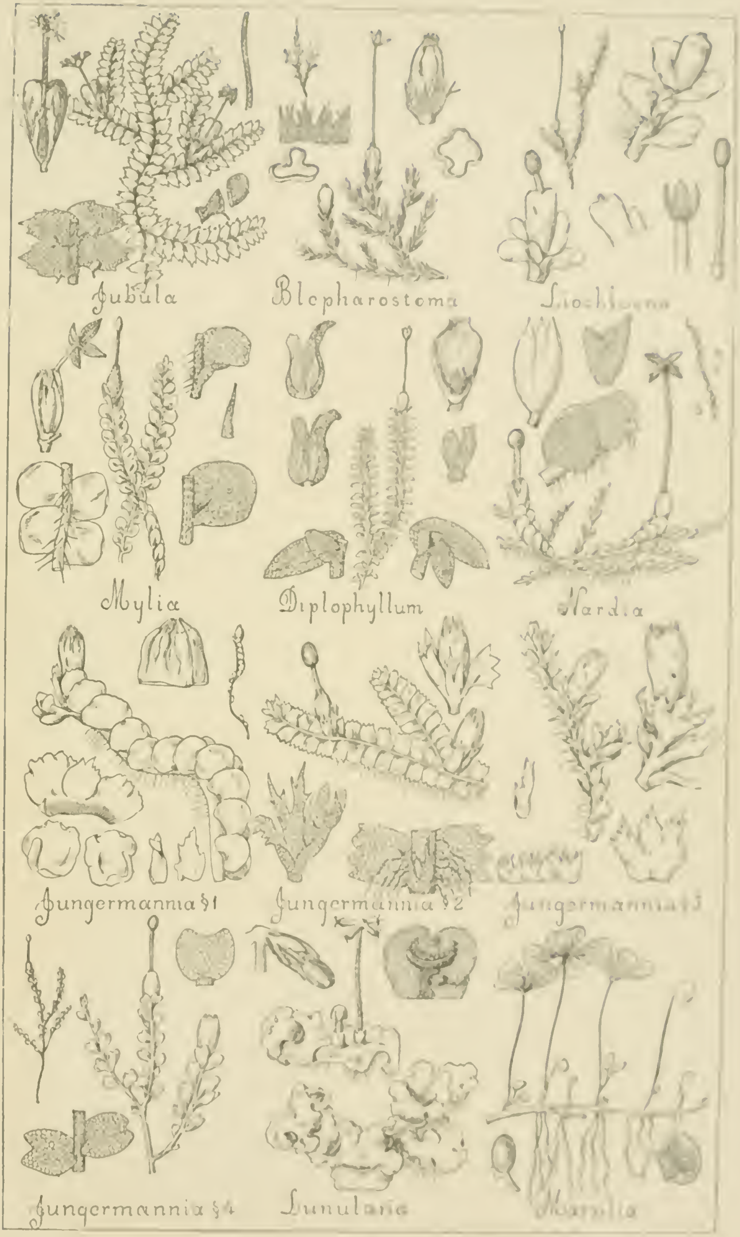
Jubula
Blepharostoma
Liochlaena
Mylia
Diplophyllum
Nardia
Jungermannia §1
Jungermannia §2
Jungermannia §3
Jungermannia §4
Lunularia
Marsilia

Flowering plant

[illegible] Phloem [illegible] outside
Xylem towards centre
Anther of - can be compared
with leaf in Sporangium
[illegible] does not exist in a single
fern
opposite is here.

[illegible] of not present
in fern. Vas cryptogram

[illegible]

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